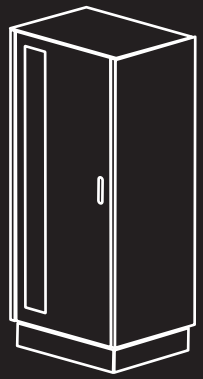
www.apc.com

AIS 5000®

10–100 kVA
400 V

Installation Manual



Contents

Safety

IMPORTANT SAFETY INSTRUCTIONS - SAVE THESE INSTRUCTIONS

IMPORTANT SAFETY INSTRUCTIONS — SAVE THESE INSTRUCTIONS

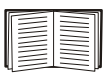
This manual contains important safety instructions for the AIS series that should be followed during installation, operation, and maintenance. See the battery installation manual for battery-specific instructions.

Symbols used in this manual

WARNING!
Risk of electric shock.

CAUTION!
Read this information to avoid equipment damage.

Indicates important information.



Indicates that more information is available on this subject in a different section of this manual.

Indicates that more information is available on the same subject in a different manual.

Use a pallet jack or a forklift for components over 54 kg.

Two people to lift a component weighing between 18 – 32 kg.

User Safety

WARNING!
This UPS contains hazardous AC and DC voltages. Only qualified electricians should connect the UPS, AC line and external batteries, and must be familiar with batteries and battery installation.
Before installing, maintaining or servicing the UPS, shut off the UPS and disconnect all sources of AC and DC power.
As the UPS has no built-in disconnection devices to switch off external AC and DC input power, ensure that disconnection devices are available as separate parts in connection with the installation!
AC and/or DC voltage will always involve a potential risk of AC voltage at UPS output generated from either batteries or utility. To avoid equipment damage or personal injury, always assume that there may be voltage at UPS output.
This system is equipped with an auto-start function. If activated, the system may start without warning. Refer to the "Programming" section for information on de-activation.
The installer must provide each external disconnecting device for this UPS system with labels with the following text:
"Isolate the Uninterruptible Power Supply (UPS) as instructed in this guide before working on circuit"

WARNING!
TEST BEFORE YOU TOUCH!
To reduce the risk of fire or electric shocks, install the UPS and external batteries in a temperature and humidity controlled indoor area, free of conductive contaminants.

WARNING!
UPS batteries are high-current sources. Shorting battery terminals, DC terminals or DC busbars can cause severe arcing, equipment damage and injury. A short circuit can cause a battery to explode. Always wear protective clothing and eye protection and use insulated tools when working on batteries.

CAUTION!
This unit contains components sensitive to electrostatic discharge (ESD). If you do not follow the ESD procedures, you may cause severe damage to electronic components.

General Information

About this manual

This Installation Manual gives a detailed overview of the various functions of the APC UPS system and contains information on how to install, connect, program and maintain the AIS 5000 UPS system.

Further information on the AIS 5000 series is available on www.apc.com.

Site Requirements

Receiving and inspecting the UPS

Your AIS 5000 UPS system has been tested and inspected for quality assurance prior to shipment from APC. To ensure that the UPS has not been damaged during transportation, carefully inspect both the exterior and interior of the equipment immediately upon receipt as described in the Receiving and Unpacking folder.

Type label. Copy type label data (serial number) to label copy below for easy identification of the system. The type label is placed on the inside of the UPS front door.

APC
www.apc.com

Hotline Support US/Canada/LAM 800 800 4APC
Hotline Support EMEA +353 91 70 2000
World Wide Support numbers Www.apc.com/support/service/geomap_world.cfm

Place label according to SKU no.	SKU no.	Model	Voltage	Current in/out	KVA input	Weight	Battery	
			Mains: 3Ø+PE, Bypass & Output: 3Ø+N+PE				Nom. Vdc	Current
	IS10KH	AIS 5000 10kVA 400V for external batteries 10kVA / 8kW	400V/400V (50Hz)	20A / 14A	14kVA	1213 lbs 550 kg	240V	38A
	IS20KH	AIS 5000 20kVA 400V for external batteries 20kVA / 16kW	400V/400V (50Hz)	39A / 29A	27kVA	1433 lbs 650 kg	240V	75A
	IS30KH	AIS 5000 30kVA 400V for external batteries 30kVA / 24kW	400V/400V (50Hz)	58A / 43A	40kVA	1653 lbs 750 kg	240V	112A
	IS40KH	AIS 5000 40kVA 400V for external batteries 40kVA / 32kW	400V/400V (50Hz)	77A / 58A	53.2kVA	1984 lbs 900 kg	240V	148A
	IS60KH	AIS 5000 60kVA 400V for external batteries 60kVA / 48kW	400V/400V (50Hz)	115A / 87A	79.5kVA	2425 lbs 1100 kg	240V	220A
	IS80KH	AIS 5000 80kVA 400V for external batteries 80kVA / 64kW	400V/400V (50Hz)	151A / 115A	104.5kVA	2866 lbs 1300 kg	240V	291A
	IS100KH	AIS 5000 100kVA 400V for external batteries 100kVA / 80kW	400V/400V (50Hz)	192A / 144A	133kVA	3307 lbs 1500 kg	240V	364A

TEST PERSONNEL DATE AND SIGNATURE

CE

Moving the equipment to site:

Before moving the equipment to the installation site, the following should be checked:

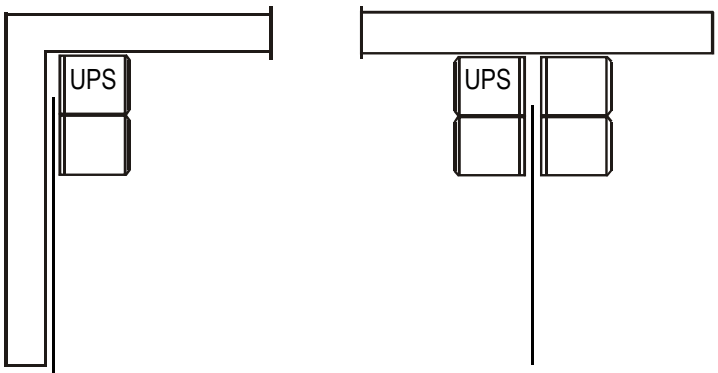
- Can the transport equipment handle the weight of the system?
- Is there enough space to transport the system to its final destination?
- Can the raised floor (double floor) handle the weight of the system?

The equipment is delivered on a pallet and can be transported on a fork-lift or a pallet truck.

The UPS is contained in a cubicle with a stable frame. This frame can carry heavy components such as transformers, chokes etc. The frame can be placed directly on a levelled concrete floor.

Clearance at installation site. The system can be installed with the back to the wall or back-to-back - however, a distance of minimum 4 inches (approx. 100 mm) between the wall and the UPS is necessary. 20 inches (approx. 500 mm) is the preferred distance (see below illustration).

A clearance of 20 inches (approx. 500 mm) above the system is necessary to ensure sufficient space for air circulation.

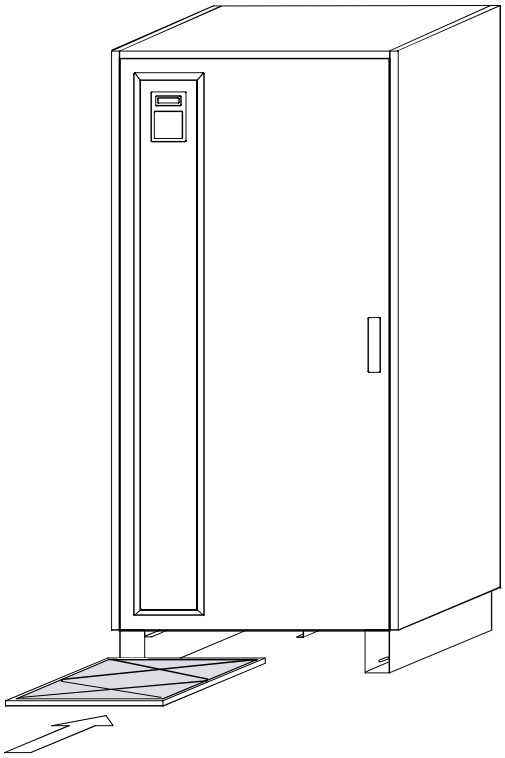


Clearance; minimum 100 mm – preferably 500 mm.

Air Filter

The air filter must be fitted at the air inlet of the UPS, and is designed for extra protection of UPS systems installed in environments with conductive dust.

Fitting the air filter

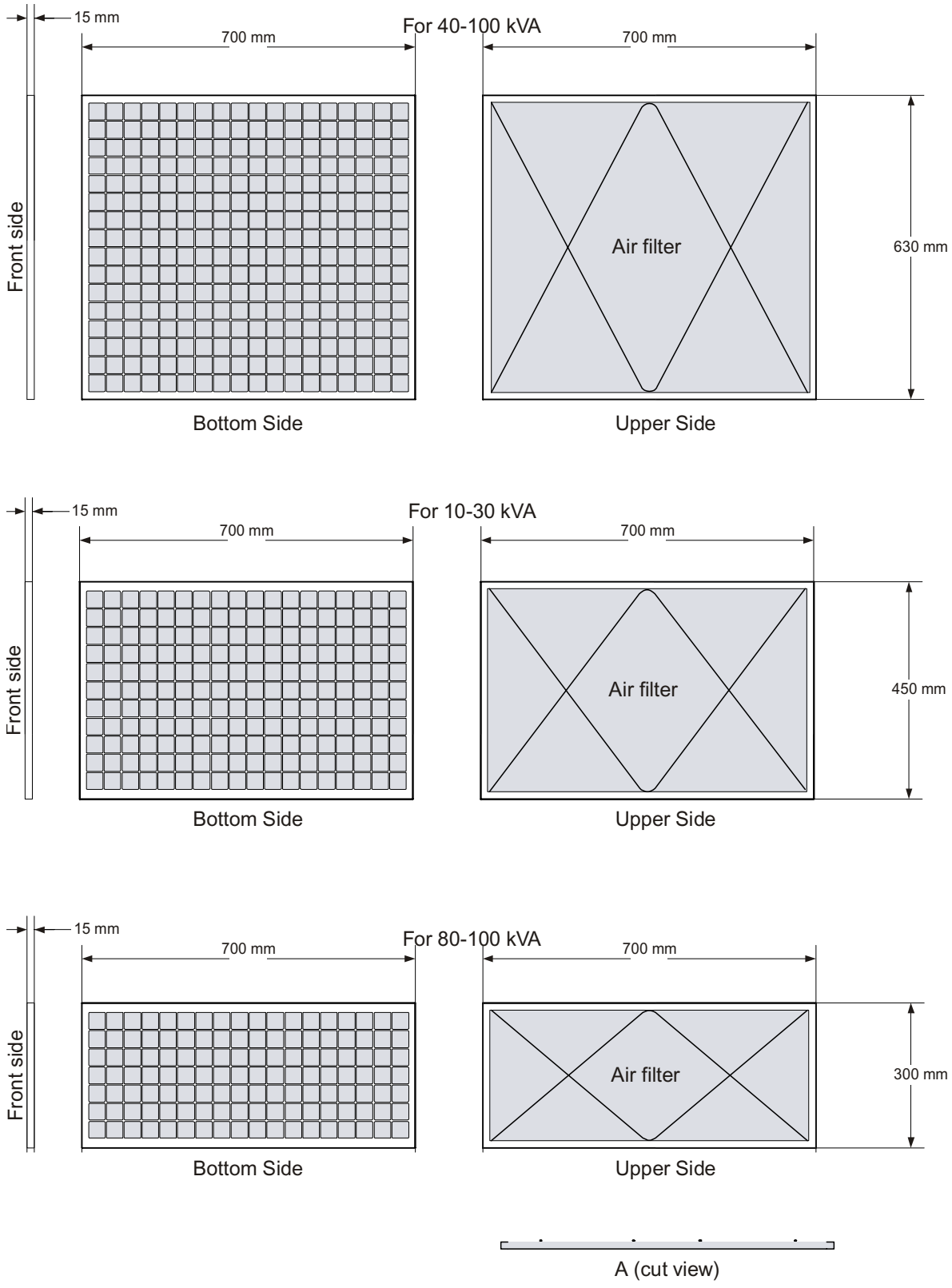


Insert the air filter in the brackets and slide it completely into the UPS enclosure.

Note

The air filter can be mounted/replaced during normal operation of the UPS.

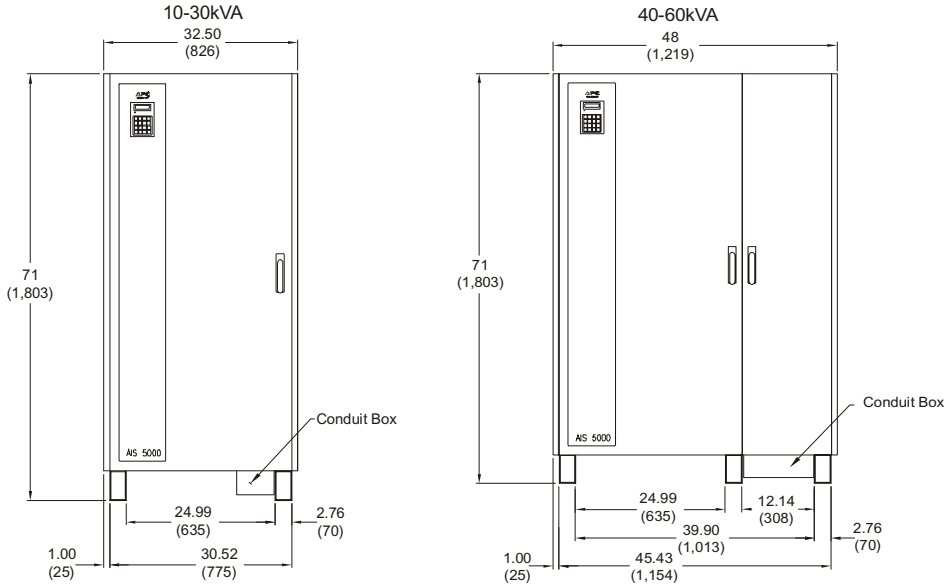
Air filter sizes

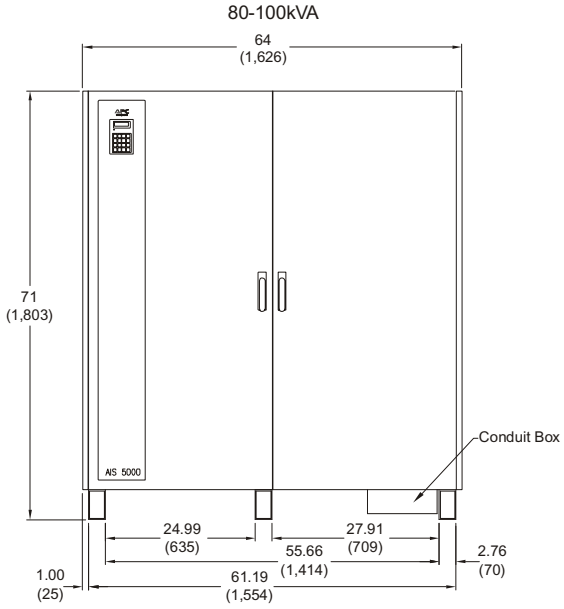


Enclosure dimensions and footprint

Enclosure dimensions.

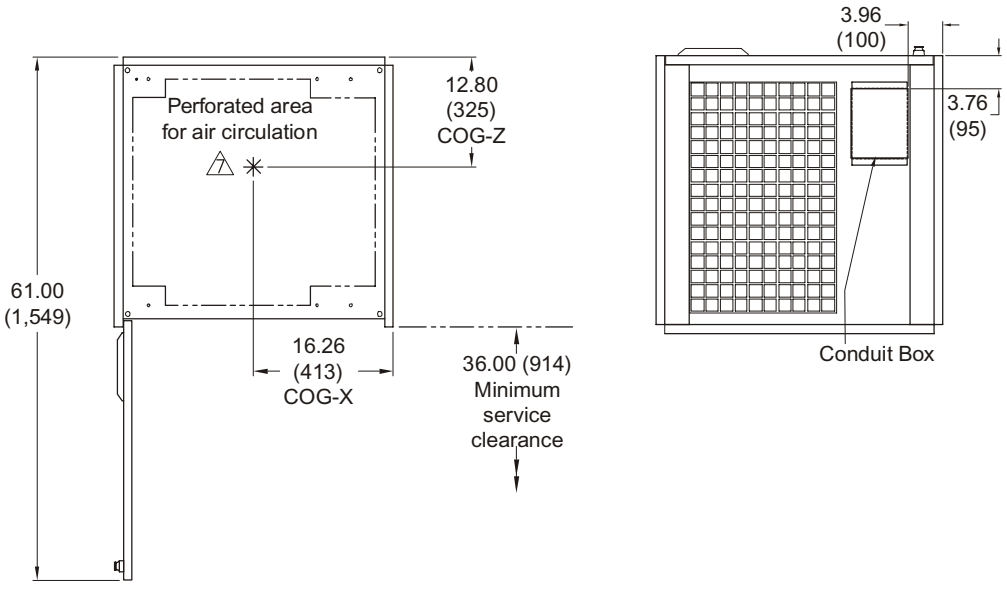
UPS	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
10 kVA	1,803	826	813	550
20 kVA	1,803	826	813	650
30 kVA	1,803	826	813	750
40 kVA	1,803	1,219	813	900
60 kVA	1,803	1,219	813	1,100
80 kVA	1,803	1,626	813	1,300
100 kVA	1,803	1,626	813	1,500



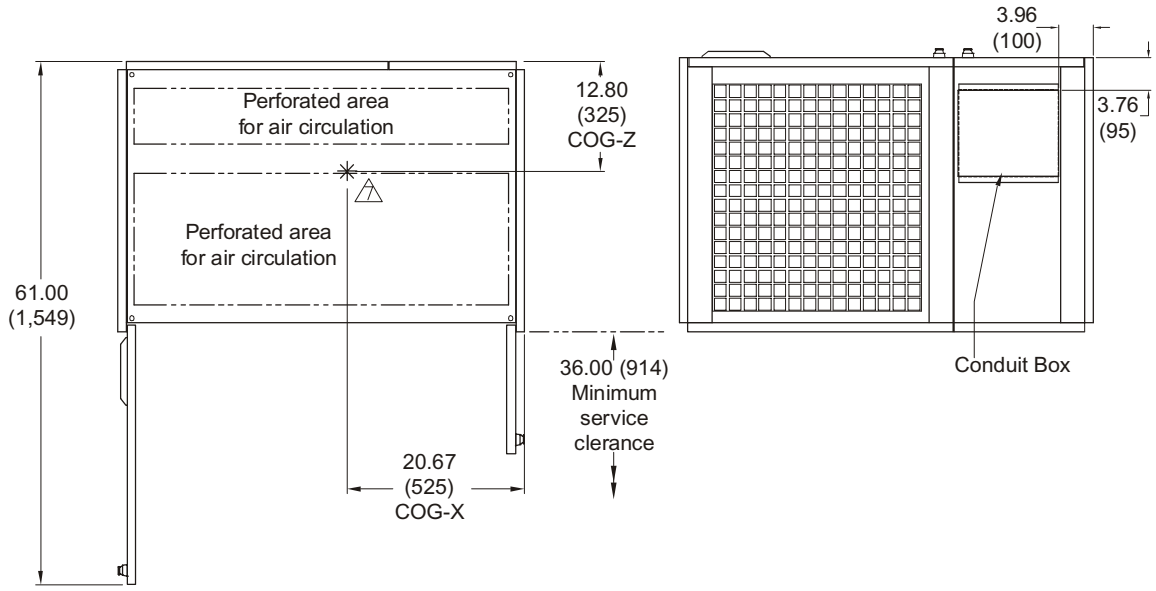


Footprint.

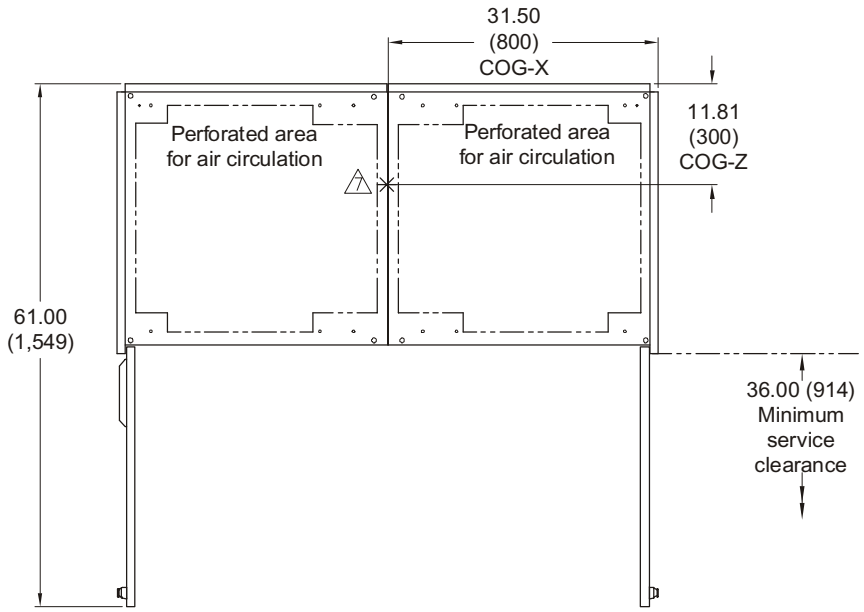
Top and bottom view of 10–30kVA UPS:

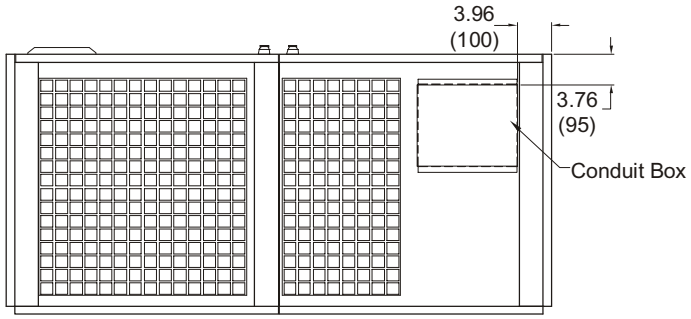


Top and bottom view of 40–60kVA UPS:



Top and bottom view of 80–100kVA UPS:

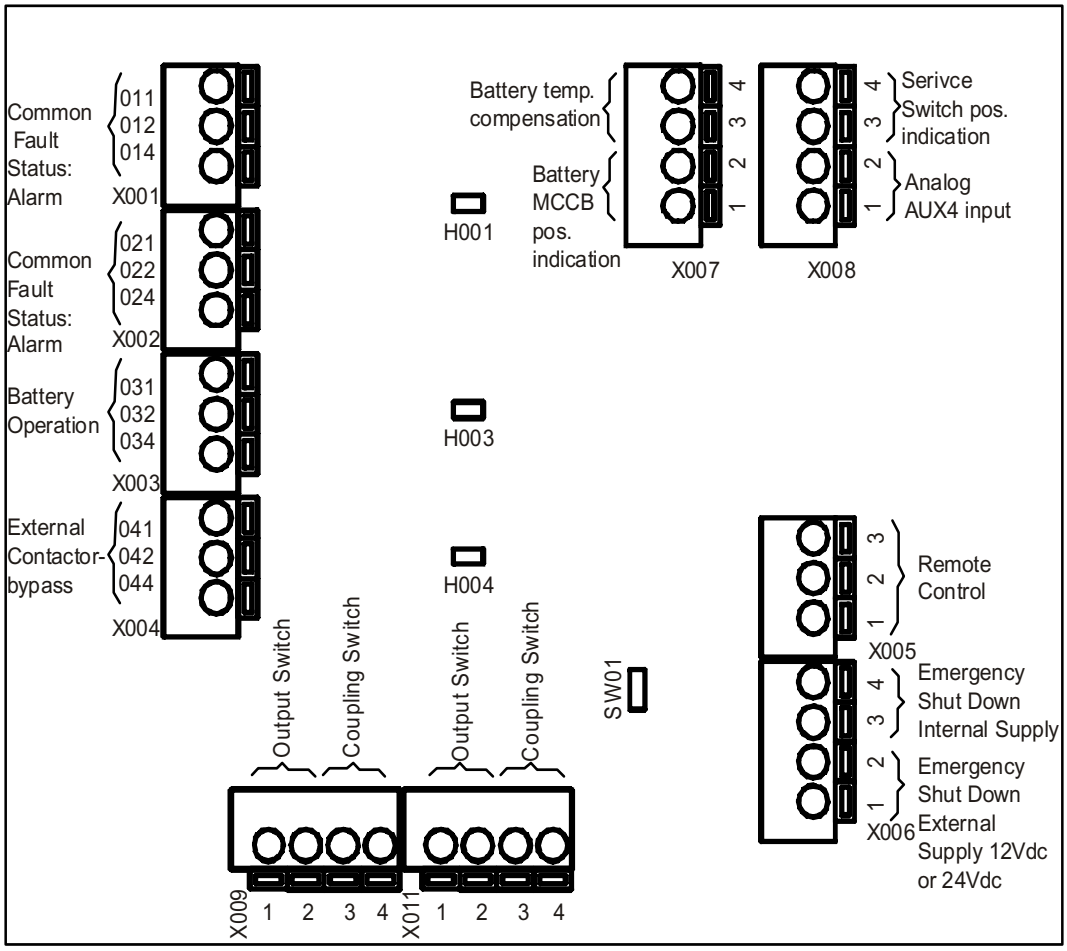




External Connection

Connecting the UPS

External connection board



Note

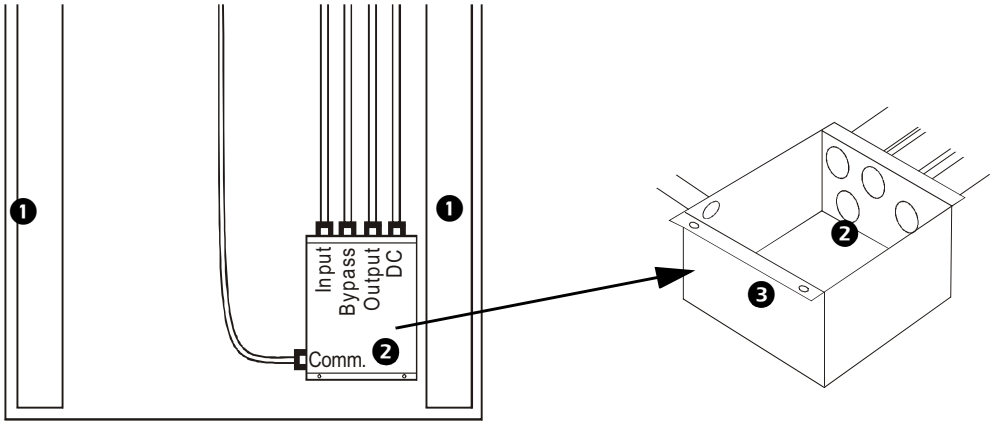
X001–X004 are relay change-over contacts 2A, 250Vac (0, 5A, 60Vdc). X006 is Emergency Power Off (EPO) on the input. X007 pin 3–4 for Battery Temperature Sensor.

Note

Use 1.5 mm CU conductors only.

Installing Conduit Boxes

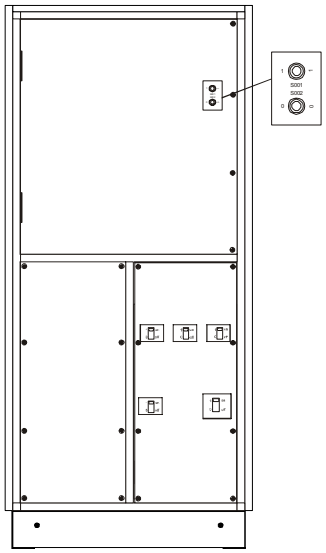
Top view:



1. UPS Feet
2. Conduit Box
3. Front of Conduit Box

Mounting the Conduit Box:

1. Open UPS front door.
2. Remove cover from the input/output section.



In order to remove the cover from the in- and output section, please remove all 8 M6×12 torx screws.

3. Place Conduit Box under UPS and align it with hole in UPS bottom plate.
4. Take out Conduit Box and make holes in Conduit Box according to below table.

Conduit sizes (mm):

	Input Conduit	Output/Bypass Conduit	Battery Conduit	Alarm Conduit
10 kVA	12.7	12.7	12.7	12.7
20 kVA	19.05	12.7	25.4	12.7
30 kVA	25.4	19.05	31.75	12.7
40 kVA	25.4	25.4	38.1	12.7
60 kVA	31.75	25.4	63.5	12.7
80 kVA	38.1	31.75	2 × 38.1	12.7
100 kVA	38.1	31.75	2 × 50	12.7

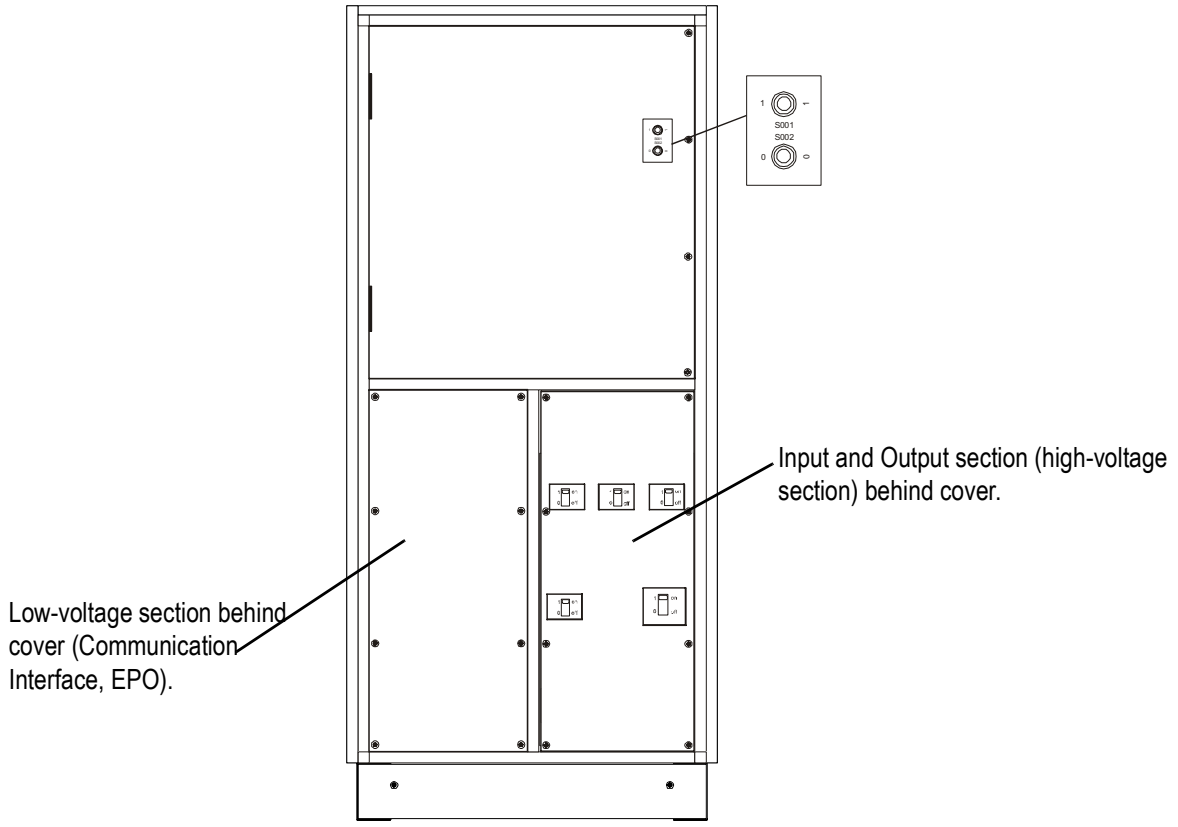
5. Install Conduit Box under UPS. Push projecting edge of Conduit Box into slot on UPS bottom plate. From inside the UPS, mount front of Conduit Box onto UPS bottom plate using 2 M4×12 cross head screws for 10–30 kVA and 3 M4×12 cross head screws for 40–100 kVA.
6. Mount conduits.
7. Feed cables.
8. Install cables according to the procedures described in the following sections.

Access to Input/Output section

To access cable terminals, open front door, remove screws and lift off front cover (remember earth wire on rear side).

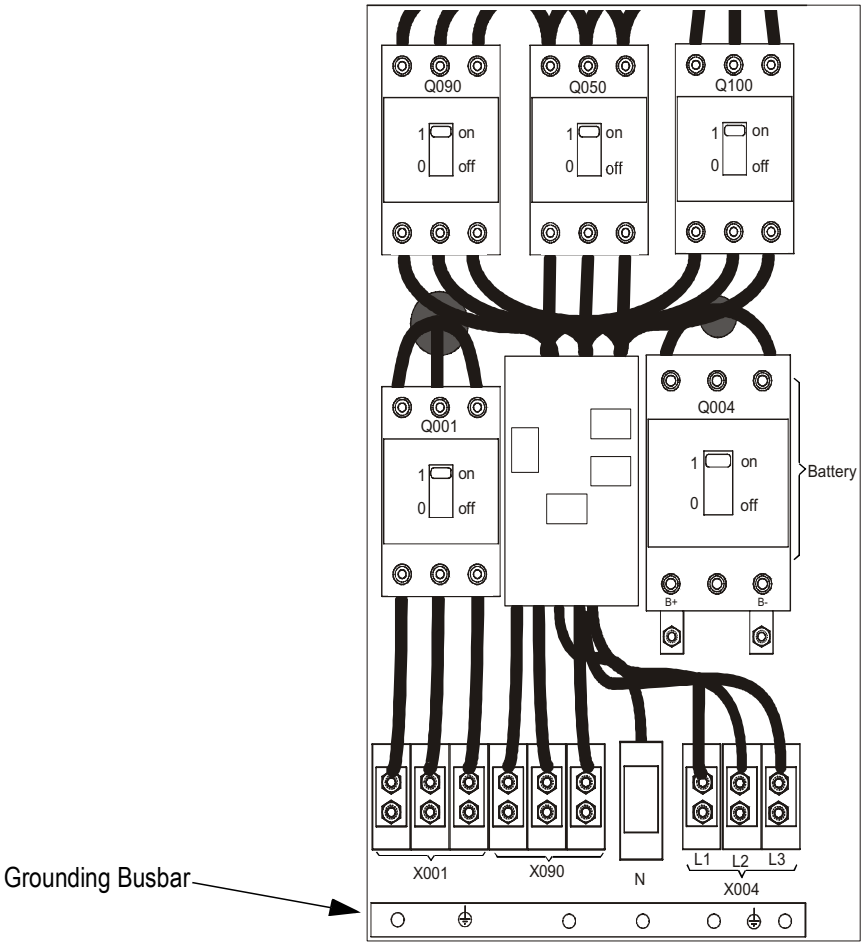
Remember to remount front cover (and earth wire) before system start-up.

CAUTION!
Ensure correct phase rotation of utility input voltage! Max. power cable size: see section with technical specifications starting on page 24.


S001
S002
Input and Output section (high-voltage section) behind cover.
Low-voltage section behind cover (Communication Interface, EPO).

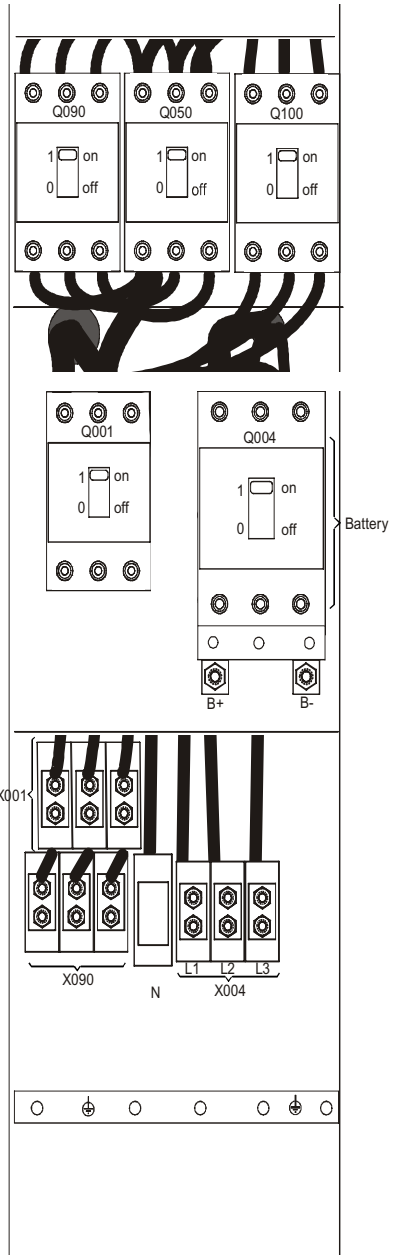
Connecting cables

Input/Output section 10–30 kVA



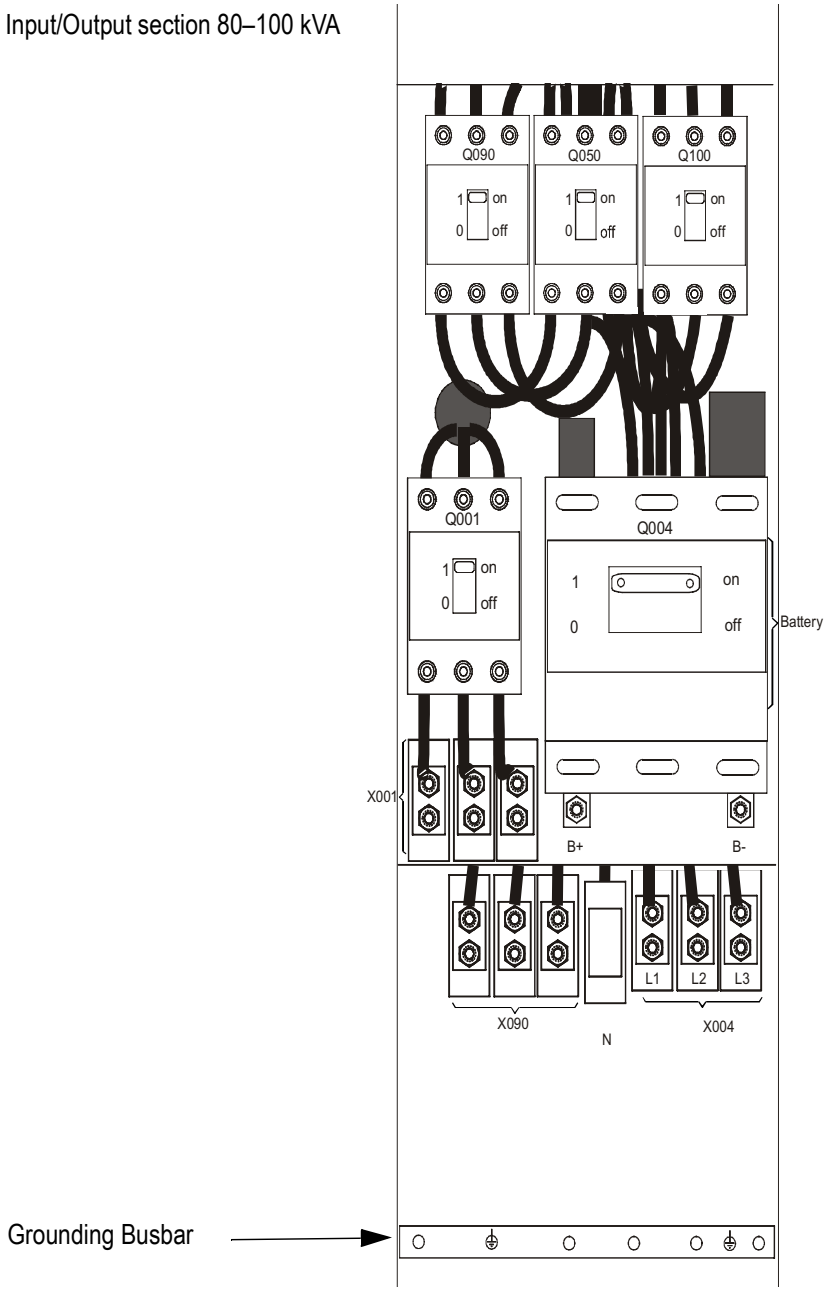
- X001 Mains Input (L1, L2, L3)
- X090 Bypass Input L1, L2, L3, N)
- X004 Output (L1, L2, L3, N)
- Q004 Battery (+, –)

Input/Output section 40–60 kVA



Grounding Busbar

- X001 Mains Input (L1, L2, L3)
- X090 Bypass Input (L1, L2, L3, N)
- X004 Output (L1, L2, L3, N)
- Q004 Battery (+, –)



- X001 Mains Input (L1, L2, L3)
- X090 Bypass Input (L1, L2, L3, N)
- X004 Output (L1, L2, L3, N)
- Q004 Battery (+, –)

Terminals.

	Input X001/Output X004/Bypass Input X090	Battery Q004	Protective Earth PE
10 kVA	M6	Direct on breaker terminals	Direct on Earth Busbar
20 kVA	M6	Direct on breaker terminals	Direct on Earth Busbar
30 kVA	M6	Direct on breaker terminals	Direct on Earth Busbar
40 kVA	M8	Direct on breaker terminals	Direct on Earth Busbar
60 kVA	M8	Direct on breaker terminals	Direct on Earth Busbar
80 kVA	M10	Direct on breaker terminals	Direct on Earth Busbar
100 kVA	M10	Direct on breaker terminals	Direct on Earth Busbar


Note

The UPS input / bypass input is 4-Wire + Ground.

Torque specifications.

Stud size	6 mm	8 mm	10 mm	12 mm
Torque	66/7.5 lb-in/Nm	133/15 lb-in/Nm	266/30 lb-in/Nm	443/50 lb-in/Nm

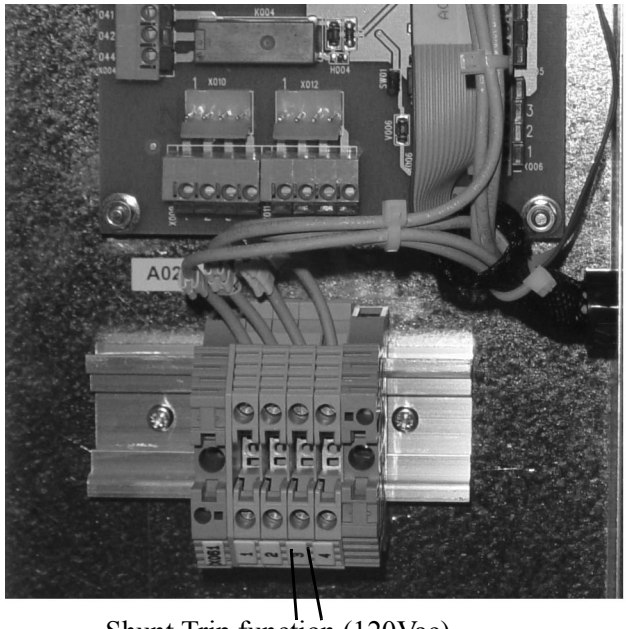
Grounding

System grounding:
Grounding busbar marked “Grounding” must be connected by grounding electrode conductor to a local grounding electrode. Grounding electrode conductor to be supplied by the customer. (See grounding busbar on illustrations starting on page 17).

Emergency Power Off (EPO)

The UPS is equipped with and EPO input (X006) on the external connection board (part of the low-voltage section). The battery breaker is equipped with a shunt trip function (X061: 3, 4).

Communication interface



Shunt Trip function (120Vac)

The 3-port communication interface (located in the low voltage section) is used when an interaction between UPS and an electrical device has to be established. The main purpose is to ensure a controlled shut-down of the device in case of failures in the mains power supply.

Communication interface ports

COM-PORT: X005

The com-port consists of 4 relay outputs from which the following information is available:

- UPS System ON/OFF
- Normal Operation/Bypass Operation
- Normal Operation/Battery Operation
- Battery Voltage OK/Battery Voltage low

One input is for remote shut-down of the UPS system.

Normally, the COM-PORT is used in connection with the automatic shut-down of computers in case of extended mains failures.

Serial Interface 20 mA Current Loop: X004

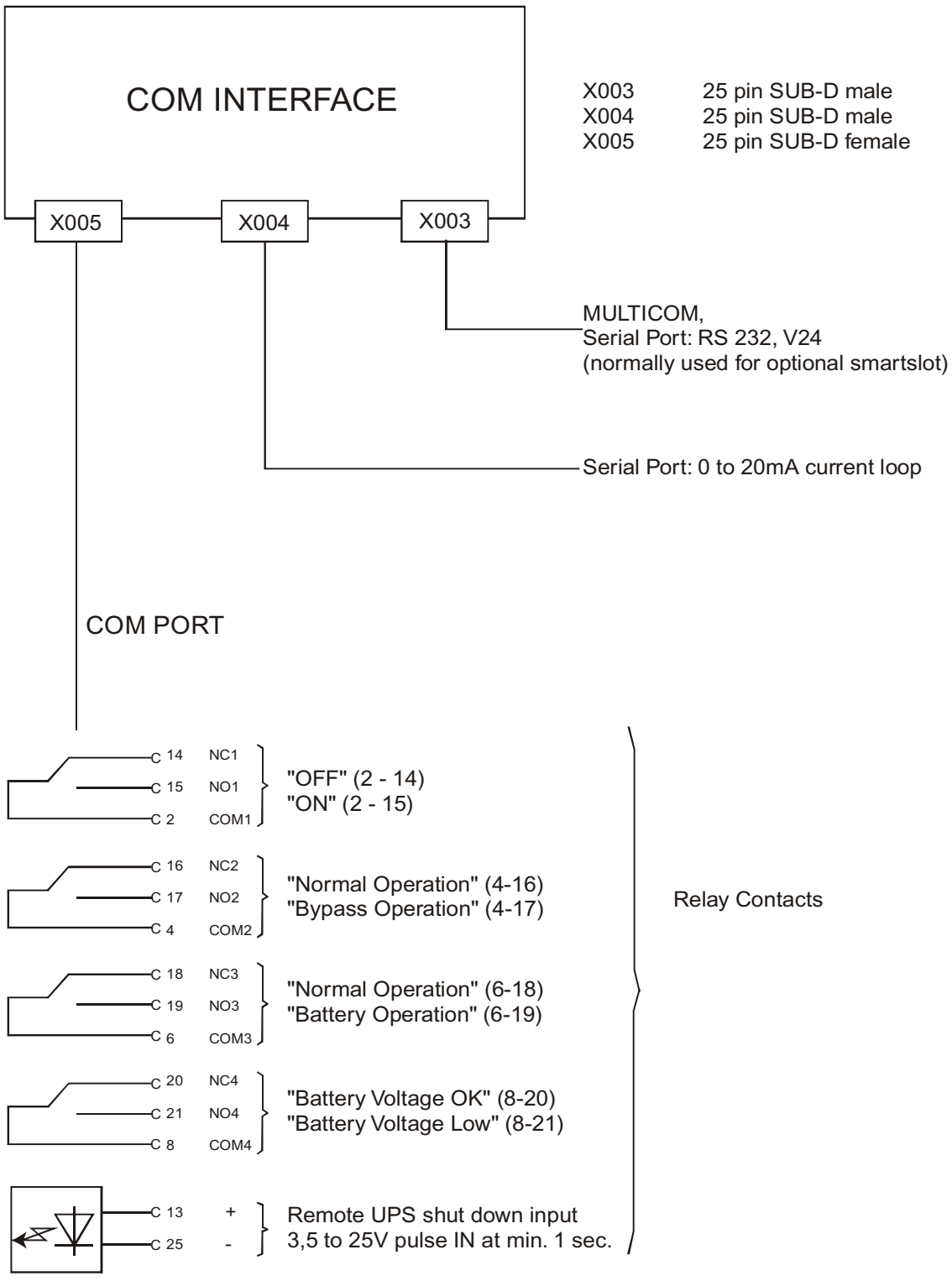
This interface consists of a 0-20mA Current loop with galvanic isolation. Information on the UPS-measured values is available on this interface.

Multicom RS232: X003

X003 is normally used for the optional smartslot, but can be used for other purposes in its place. This interface also has galvanic isolation and provides information on the UPS condition and measured values.

For further information on these 2 interfaces, a protocol can be requested from APC.

Overview of Communication interface



10kVA 400V UPS

IS10KH

Performance - Linear Load

DC to AC Efficiency [%]	87.0
AC to AC Efficiency [%]	83.0
Heat Dissipation [BTU/h] [W]	6,003/1,758

Electrical Input

Mains	
Voltage	400 V 3 Wire + G
P Nom.	10.3 kW
I Nom. (Nominal input current based on nominal mains voltage and batteries fully charged at 100% ohmic load)	17.7 A
I Max. (Maximum input current based on full battery recharge and nominal mains voltage at 100% ohmic load)	19.9 A
Over-Current protection [A] (Based on continuous full load)	20 A
Input Voltage Range	+ 10%, -15% programmable
Input Frequency	50 Hz $\pm$ 6% programmable
Current Distortion	< 12%
Power Factor	0.8 - 0.9
Bypass	
Voltage	400 V 3 Wire + N + G
I Nom	14.4 A
Over-Current protection [A] (Based on continuous full load)	15 A
Bypass Voltage Range	$\pm$ 10% programmable

Electrical Output

Voltage	400 V 3 Wire + N + G
Nominal Current (The output Current is based on the nominal apparent power of the UPS)	14.4 A
Frequency Range	50Hz (adjustable 0.25, 0.50, 1-8%)

Electrical Output

Frequency Regulation	50 Hz, ± 0.1% free running
Output Voltage Range	100% static symmetrical load ± 1%, 100% static asymmetrical load ± 3%, no load to full load ± 4%
Output Harmonic Distortion	<3% linear load <5%
Load Crest Factor	5: 1
Load Power Factor	0.9 leading to 0.7 lagging
Overload Capacity	150% for 1 min., 125% for 10 min., Bypass Operation 1000% for 5 cycles
Connection Type	3 PH + N + G

Battery - External Only

Nominal Voltage (Nominal battery voltage assumed to be 2.0 V/cell (lead technology)	240 V
Number of Battery Cells	120
Float Charge Voltage	272 Volt DC programmable
Charge Voltage Range	100 to 115% of the DC nominal Voltage, ± 1% IU characteristic
Low Battery Warning Range	210-222 Vdc (Factory Setting 210 V)
Low Battery Shutdown	204 Vdc
Full Load (P) (The battery power takes in to account the DC-AC efficiency of the main inverter for linear load)	9.2 kW
Recommended Breaker Size [A]	60 A
Connection Type	Hard Wire 3-wire (DC+/- + G)
Nominal Discharge Current [A] (The battery nominal discharge current is based on the nominal cell Voltage of 2.0 V/cell - number of cells = 120 which gives a total Voltage of 240V)	38 A
Max. Discharge Current [A] (The battery max. discharge current is based on a cell end Voltage of 1.70V/cell which gives a total Voltage of 204V)	46 A

Communication and Management

Control Panel	Multi-function LCD status and control console
RS232 Port	Yes
Network Management Card 10/100 Base T	Yes
Audible Alarm	Audible and visible alarms prioritized by severity
Slots Empty	1
Modbus/BMS Card	Optional

Communication and Management	
Emergency Power Off (EPO)	Yes

Physical Values	
Dimensions (H × W × D)	
Unit	1,800 × 825 × 810 mm
Shipping	2,080 × 1,016 × 1,016 mm
Weight	
Unit	550 kg
Shipping	590 kg
Max. Power Cable size [mm]	10
Recommended Cable sizes	
Ext. Input Cable [mm]	2.5
Ground Cable [mm]	10
Ext. Output Cable [mm]	2.5
Ext. Battery Cable [mm]	10
Ext. Alarm Cable Max. [mm]	1.5
Recommended Conduit sizes	
Input	1/2”
Output/Bypass	1/2”
Battery	1/2”
Alarm	1/2”

Environmental Values	
Temperature	
Operating	0^{o} - 40^{o} C
Storage	-40^{o} - 70^{o} C
Elevation	
Operating	0 - 1,000 m
Storage	0 - 5,000 m
Humidity	Max. 95% non-conditioned
Protection Class	IP30 (IP32 optional)
Transient Attenuation	Differential mode 60 to 80 dB, Common mode 120 dB
Audible Noise at 3.28 feet (1 m)	60-70 dB, depending on type

Compliance	
Approvals	IEC 62040/EN 50091 Class A, VFI-SS-112

Options

IP32 Roof	864 × 864 mm
Relay Boards	2 relay boards with each 16 dry contacts
Modbus/BMS Card	

20kVA 400V UPS

IS20KH

Performance - Linear Load

DC to AC Efficiency [%]	89.0
AC to AC Efficiency [%]	85.3
Heat Dissipation [BTU/h] [W]	9,923/2,905

Electrical Input

Mains	
Voltage	400 V 3 Wire + G
P Nom.	19.88 kW
I Nom. (Nominal input current based on nominal mains voltage and batteries fully charged at 100% ohmic load)	33.79 A
I Max. (Maximum input current based on full battery recharge and nominal mains voltage at 100% ohmic load)	39.4 A
Over-Current protection [A] (Based on continuous full load)	40 A
Input Voltage Range	+ 10%, -15% programmable
Input Frequency	50 Hz $\pm$ 6% programmable
Current Distortion	< 12%
Power Factor	0.8 - 0.9
Bypass	
Voltage	400 V 3 Wire + N + G
I Nom.	28.9 A
Over-Current protection [A] (Based on continuous full load)	30 A
Bypass Voltage Range	$\pm$ 10% programmable

Electrical Output

Voltage	400 V 3 Wire + N + G
Nominal Current (The output Current is based on the nominal apparent power of the UPS)	28.9 A
Frequency Range	50Hz (adjustable 0.25, 0.50, 1-8%)

Electrical Output

Frequency Regulation	50 Hz, ± 0.1% free running
Output Voltage Range	100% static symmetrical load ± 1%, 100% static asymmetrical load ± 3%, no load to full load ± 4%
Output Harmonic Distortion	<3% linear load <5%
Load Crest Factor	5: 1
Load Power Factor	0.9 leading to 0.7 lagging
Overload Capacity	150% for 1 min., 125% for 10 min., Bypass Operation 1000% for 5 cycles
Connection Type	3 PH + N + G

Battery - External Only

Nominal Voltage (Nominal battery voltage assumed to be 2.0 V/cell (lead technology)	240 V
Number of Battery Cells	120
Float Charge Voltage	272 Volt DC programmable
Charge Voltage Range	100 to 115% of the DC nominal Voltage, ± 1% IU characteristic
Low Battery Warning Range	210 - 222 Vdc (Factory Setting 210 V)
Low Battery Shutdown	204 Vdc
Full Load (P) (The battery power takes in to account the DC-AC efficiency of the main inverter for linear load)	18.0 kW
Recommended Breaker Size [A]	125 A
Connection Type	Hard Wire 3-wire (DC+/- + G)
Nominal Discharge Current [A] (The battery nominal discharge current is based on the nominal cell Voltage of 2.0 V/cell - number of cells = 120 which gives a total Voltage of 240V)	75 A
Max. Discharge Current [A] (The battery max. discharge current is based on a cell end Voltage of 1.70V/cell which gives a total Voltage of 204V)	91 A

Communication and Management

Control Panel	Multi-function LCD status and control console
RS232 Port	Yes
Network Management Card 10/100 Base T	Yes
Audible Alarm	Audible and visible alarms prioritized by severity
Slots Empty	1
Modbus/BMS Card	Optional

Communication and Management	
Emergency Power Off (EPO)	Yes

Physical Values	
Dimensions (H × W × D)	
Unit	1,800 × 825 × 810 mm
Shipping	2,080 × 1,016 × 1,016 mm
Weight	
Unit	650 kg
Shipping	690 kg
Max. Power Cable size [mm]	25
Recommended Cable sizes	
Ext. Input Cable [mm]	4
Ground Cable [mm]	10
Ext. Output Cable [mm]	4
Ext. Battery Cable [mm]	25
Ext. Alarm Cable Max. [mm]	1.5
Recommended Conduit sizes	
Input	1”
Output	1/2”
Battery	1”
Alarm	1/2”

Environmental Values	
Temperature	
Operating	0^{o} - 40^{o} C
Storage	-40^{o} - 70^{o} C
Elevation	
Operating	0 - 1,000 m
Storage	0 - 5,000 m
Humidity	Max. 95% non-conditioned
Protection Class	IP30 (IP32 optional)
Transient Attenuation	Differential mode 60 to 80 dB, Common mode 120 dB
Audible Noise at 3.28 feet (1 m)	60-70 dB, depending on type

Compliance	
Approvals	IEC 62040/EN 50091 Class A, VFI-SS-112

Options

IP32 Roof	864 × 864 mm
Relay Boards	2 relay boards with each 16 dry contacts
Modbus/BMS Card	

30kVA 400V UPS

IS30KH

Performance - Linear Load

DC to AC Efficiency [%]	89.4
AC to AC Efficiency [%]	85.7
Heat Dissipation [BTU/h] [W]	13,833/4,050

Electrical Input

Mains	
Voltage	400 V 3 Wire + G
P Nom.	28.35 kW
I Nom. (Nominal input current based on nominal mains voltage and batteries fully charged at 100% ohmic load)	47.86 A
I Max. (Maximum input current based on full battery recharge and nominal mains voltage at 100% ohmic load)	59.9 A
Over-Current protection [A] (Based on continuous full load)	60 A
Input Voltage Range	+ 10%, -15% programmable
Input Frequency	50 Hz $\pm$ 6% programmable
Current Distortion	< 12%
Power Factor	0.8 - 0.9
Bypass	
Voltage	400 V 3 Wire + N + G
I Nom	43.3 A
Over-Current protection [A] (Based on continuous full load)	45 A
Bypass Voltage Range	$\pm$ 10% programmable

Electrical Output

Voltage	400 V 3 Wire + N + G
Nominal current (The output current is based on the nominal apparent power of the UPS)	43.3 A
Frequency Range	50Hz (adjustable 0.25, 0.50, 1-8%)

Electrical Output

Frequency Regulation	50 Hz, ± 0.1% free running
Output Voltage Range	100% static symmetrical load ± 1%, 100% static asymmetrical load ± 3%, no load to full load ± 4%
Output Harmonic Distortion	<3% linear load <5%
Load Crest Factor	5: 1
Load Power Factor	0.9 leading to 0.7 lagging
Overload Capacity	150% for 1 min., 125% for 10 min., Bypass Operation 1000% for 5 cycles
Connection Type	3 PH + N + G

Battery - External Only

Nominal Voltage (Nominal battery voltage assumed to be 2.0 V/cell (lead technology)	240 V
Number of Battery Cells	120
Float Charge Voltage	272 Volt DC programmable
Charge Voltage Range	100 to 115% of the DC nominal Voltage, ± 1% IU characteristic
Low Battery Warning Range	210 - 222 Vdc (Factory Setting 210 V)
Low Battery Shutdown	204 Vdc
Full Load (P) (The battery power takes in to account the DC-AC efficiency of the main inverter for linear load)	26.7 kW
Recommended Breaker Size [A]	150 A
Connection Type	Hard Wire 3-wire (DC+/- + G)
Nominal Discharge Current [A] (The battery nominal discharge current is based on the nominal cell Voltage of 2.0 V/cell - number of cells = 120 which gives a total Voltage of 240V)	111 A
Max. Discharge Current [A] (The battery max. discharge current is based on a cell end Voltage of 1.70V/cell which gives a total Voltage of 204V)	135 A

Communication and Management

Control Panel	Multi-function LCD status and control console
RS232 Port	Yes
Network Management Card 10/100 Base T	Yes
Audible Alarm	Audible and visible alarms prioritized by severity
Slots Empty	1
Modbus/BMS Card	Optional

Communication and Management	
Emergency Power Off (EPO)	Yes

Physical Values	
Dimensions (H × W × D)	
Unit	1,800 × 825 × 810 mm
Shipping	2,080 × 1,016 × 1,016 mm
Weight	
Unit	750 kg
Shipping	790 kg
Max. Power Cable size [mm]	50
Recommended Cable sizes	
Ext. Input Cable [mm]	10
Ground Cable [mm]	10
Ext. Output Cable [mm]	10
Ext. Battery Cable [mm]	50
Ext. Alarm Cable Max. [mm]	1.5
Recommended Conduit sizes	
Input	1.25”
Output	3/4”
Battery	1.25”
Alarm	1/2”

Environmental Values	
Temperature	
Operating	0^{o} - 40^{o} C
Storage	-40^{o} - 70^{o} C
Elevation	
Operating	0 - 1,000 m
Storage	0 - 5,000 m
Humidity	Max. 95% non-conditioned
Protection Class	IP30 (IP32 optional)
Transient Attenuation	Differential mode 60 to 80 dB, Common mode 120 dB
Audible Noise at 3.28 feet (1 m)	60-70 dB, depending on type

Compliance	
Approvals	IEC 62040/EN 50091 Class A, VFI-SS-112

Options

IP32 Roof	864 × 864 mm
Relay Boards	2 relay boards with each 16 dry contacts
Modbus/BMS Card	

40kVA 400V UPS

IS40KH

Performance - Linear Load

DC to AC Efficiency [%]	90.8
AC to AC Efficiency [%]	87.0
Heat Dissipation [BTU/h] [W]	16,333/4,782

Electrical Input

Mains	
Voltage	400 V 3 Wire + G
P Nom.	36.9 kW
I Nom. (Nominal input current based on nominal mains voltage and batteries fully charged at 100% ohmic load)	61.93 A
I Max. (Maximum input current based on full battery recharge and nominal mains voltage at 100% ohmic load)	77.8 A
Over-Current protection [A] (Based on continuous full load)	80 A
Input Voltage Range	+ 10%, -15% programmable
Input Frequency	50 Hz $\pm$ 6% programmable
Current Distortion	< 12%
Power Factor	0.8 - 0.9
Bypass	
Voltage	400 V 3 Wire + N + G
I Nom	48.1 A
Over-Current protection [A] (Based on continuous full load)	60 A
Bypass Voltage Range	$\pm$ 10% programmable

Electrical Output

Voltage	400 V 3 Wire + N + G
Nominal current (The output current is based on the nominal apparent power of the UPS)	57.7 A
Frequency Range	50Hz (adjustable 0.25, 0.50, 1-8%)

Electrical Output

Frequency Regulation	50 Hz, ± 0.1% free running
Output Voltage Range	100% static symmetrical load ± 1%, 100% static asymmetrical load ± 3%, no load to full load ± 4%
Output Harmonic Distortion	<3% linear load <5%
Load Crest Factor	5: 1
Load Power Factor	0.9 leading to 0.7 lagging
Overload Capacity	150% for 1 min., 125% for 10 min., Bypass Operation 1000% for 5 cycles
Connection Type	3 PH + N + G

Battery - External Only

Nominal Voltage (Nominal battery voltage assumed to be 2.0 V/cell (lead technology)	240 V
Number of Battery Cells	120
Float Charge Voltage	272 Volt DC programmable
Charge Voltage Range	100 to 115% of the DC nominal Voltage, ± 1% IU characteristic
Low Battery Warning Range	210 - 222 Vdc (Factory Setting 210 V)
Low Battery Shutdown	204 Vdc
Full Load (P) (The battery power takes in to account the DC-AC efficiency of the main inverter for linear load)	35.4 kW
Recommended Breaker Size [A]	200 A
Connection Type	Hard Wire 3-wire (DC+/- + G)
Nominal Discharge Current [A] (The battery nominal discharge current is based on the nominal cell Voltage of 2.0 V/cell - number of cells = 120 which gives a total Voltage of 240V)	147 A
Max. Discharge Current [A] (The battery max. discharge current is based on a cell end Voltage of 1.70V/cell which gives a total Voltage of 204V)	179 A

Communication and Management

Control Panel	Multi-function LCD status and control console
RS232 Port	Yes
Network Management Card 10/100 Base T	Yes
Audible Alarm	Audible and visible alarms prioritized by severity
Slots Empty	1
Modbus/BMS Card	Optional

Communication and Management	
Emergency Power Off (EPO)	Yes

Physical Values	
Dimensions (H × W × D)	
Unit	1,800 × 1,200 × 810 mm
Shipping	2,080 × 1,422 × 1,016 mm
Weight	
Unit	900 kg
Shipping	950 kg
Max. Power Cable size [mm]	70
Recommended Cable sizes [mm]	
Ext. Input Cable [mm]	16
Ground Cable [mm]	16
Ext. Output Cable [mm]	16
Ext. Battery Cable [mm]	70
Ext. Alarm Cable Max. [mm]	1.5
Recommended Conduit sizes	
Input	1.25”
Output	1”
Battery	1.5”
Alarm	1/2”

Environmental Values	
Temperature	
Operating	0^{o} - 40^{o} C
Storage	-40^{o} - 70^{o} C
Elevation	
Operating	0 - 1,000 m
Storage	0 - 5,000 m
Humidity	Max. 95% non-conditioned
Protection Class	IP30 (IP32 optional)
Transient Attenuation	Differential mode 60 to 80 dB, Common mode 120 dB
Audible Noise at 3.28 feet (1 m)	60-70 dB, depending on type

Compliance	
Approvals	IEC 62040/EN 50091 Class A, VFI-SS-112

Options

IP32 Roof	1,270 × 864 mm
Relay Boards	2 relay boards with each 16 dry contacts
Modbus/BMS Card	

60kVA 400V UPS

IS60KH

Performance - Linear Load

DC to AC Efficiency [%]	92.6
AC to AC Efficiency [%]	87.9
Heat Dissipation [BTU/h] [W]	22,338/6,541

Electrical Input

Mains	
Voltage	400 V 3 Wire + G
P Nom.	54.42 kW
I Nom. (Nominal input current based on nominal mains voltage and batteries fully charged at 100% ohmic load)	90.08 A
I Max. (Maximum input current based on full battery recharge and nominal mains voltage at 100% ohmic load)	117 A
Over-Current protection [A] (Based on continuous full load)	125 A
Input Voltage Range	+ 10%, -15% programmable
Input Frequency	50 Hz $\pm$ 6% programmable
Current Distortion	< 12%
Power Factor	0.8 - 0.9
Bypass	
Voltage	400 V 3 Wire + N + G
I Nom	86.6 A
Over-Current protection [A] (Based on continuous full load)	90 A
Bypass Voltage Range	$\pm$ 10% programmable

Electrical Output

Voltage	400 V 3 Wire + N + G
Nominal current (The output current is based on the nominal apparent power of the UPS)	86.6 A
Frequency Range	50Hz (adjustable 0.25, 0.50, 1-8%)

Electrical Output

Frequency Regulation	50 Hz, ± 0.1% free running
Output Voltage Range	100% static symmetrical load ± 1%, 100% static asymmetrical load ± 3%, no load to full load ± 4%
Output Harmonic Distortion	<3% linear load <5%
Load Crest Factor	5: 1
Load Power Factor	0.9 leading to 0.7 lagging
Overload Capacity	150% for 1 min., 125% for 10 min., Bypass Operation 1000% for 5 cycles
Connection Type	3 PH + N + G

Battery - External Only

Nominal Voltage (Nominal battery voltage assumed to be 2.0 V/cell (lead technology)	240 V
Number of Battery Cells	120
Float Charge Voltage	272 Volt DC programmable
Charge Voltage Range	100 to 115% of the DC nominal Voltage, ± 1% IU characteristic
Low Battery Warning Range	210 - 222 Vdc (Factory Setting 210 V)
Low Battery Shutdown	204 Vdc
Full Load (P) (The battery power takes in to account the DC-AC efficiency of the main inverter for linear load)	52.7 kW
Recommended Breaker Size [A]	300 A
Connection Type	Hard Wire 3-wire (DC+/- + G)
Nominal Discharge Current [A] (The battery nominal discharge current is based on the nominal cell Voltage of 2.0 V/cell - number of cells = 120 which gives a total Voltage of 240V)	220 A
Max. Discharge Current [A] (The battery max. discharge current is based on a cell end Voltage of 1.70V/cell which gives a total Voltage of 204V)	266 A

Communication and Management

Control Panel	Multi-function LCD status and control console
RS232 Port	Yes
Network Management Card 10/100 Base T	Yes
Audible Alarm	Audible and visible alarms prioritized by severity
Slots Empty	1
Modbus/BMS Card	Optional

Communication and Management	
Emergency Power Off (EPO)	Yes

Physical Values	
Dimensions (H × W × D)	
Unit	1,800 × 1,200 × 810 mm
Shipping	2,080 × 1,422 × 1,016 mm
Weight	
Unit	1,100 kg
Shipping	1,150 kg
Max. Power Cable size [mm]	120
Recommended Cable sizes	
Ext. Input Cable [mm]	25
Ground Cable [mm]	25
Ext. Output Cable [mm]	16
Ext. Battery Cable [mm]	120
Ext. Alarm Cable Max. [mm]	1.5
Recommended Conduit sizes	
Input	1.25”
Output	1”
Battery	2.5”
Alarm	1/2”

Environmental Values	
Temperature	
Operating	0^{o} - 40^{o} C
Storage	-40^{o} - 70^{o} C
Elevation	
Operating	0 - 1,000 m
Storage	0 - 5,000 m
Humidity	Max. 95% non-conditioned
Protection Class	IP30 (IP32 optional)
Transient Attenuation	Differential mode 60 to 80 dB, Common mode 120 dB
Audible Noise at 3.28 feet (1 m)	60-70 dB, depending on type

Compliance	
Approvals	IEC 62040/EN 50091 Class A, VFI-SS-112

Options

IP32 Roof	1,270 × 864 mm
Relay Boards	2 relay boards with each 16 dry contacts
Modbus/BMS Card	

80kVA 400V UPS

IS80KH

Performance - Linear Load

DC to AC Efficiency [%]	91.0
AC to AC Efficiency [%]	87.9
Heat Dissipation [BTU/h] [W]	29,809/8,728

Electrical Input

Mains	
Voltage	400 V 3 Wire + G
P Nom.	72.33 kW
I Nom. (Nominal input current based on nominal mains voltage and batteries fully charged at 100% ohmic load)	118.23 A
I Max. (Maximum input current based on full battery recharge and nominal mains voltage at 100% ohmic load)	152.8 A
Over-Current protection [A] (Based on continuous full load)	160 A
Input Voltage Range	+ 10%, -15% programmable
Input Frequency	50 Hz $\pm$ 6% programmable
Current Distortion	< 12%
Power Factor	0.8 - 0.9
Bypass	
Voltage	400 V 3 Wire + N + G
I Nom	115.5 A
Over-Current protection [A] (Based on continuous full load)	125 A
Bypass Voltage Range	$\pm$ 10% programmable

Electrical Output

Voltage	400 V 3 Wire + N + G
Nominal current (The output current is based on the nominal apparent power of the UPS)	115.5 A
Frequency Range	50Hz (adjustable 0.25, 0.50, 1-8%)

Electrical Output

Frequency Regulation	50 Hz, ± 0.1% free running
Output Voltage Range	100% static symmetrical load ± 1%, 100% static asymmetrical load ± 3%, no load to full load ± 4%
Output Harmonic Distortion	<3% linear load <5%
Load Crest Factor	5: 1
Load Power Factor	0.9 leading to 0.7 lagging
Overload Capacity	150% for 1 min., 125% for 10 min., Bypass Operation 1000% for 5 cycles
Connection Type	3 PH + N + G

Battery - External Only

Nominal Voltage (Nominal battery voltage assumed to be 2.0 V/cell (lead technology)	240 V
Number of Battery Cells	120
Float Charge Voltage	272 Volt DC programmable
Charge Voltage Range	100 to 115% of the DC nominal Voltage, ± 1% IU characteristic
Low Battery Warning Range	210 - 222 Vdc (Factory Setting 210 V)
Low Battery Shutdown	204 Vdc
Full Load (P) (The battery power takes in to account the DC-AC efficiency of the main inverter for linear load)	69.9 kW
Recommended Breaker Size [A]	400 A
Connection Type	Hard Wire 3-wire (DC+/- + G)
Nominal Discharge Current [A] (The battery nominal discharge current is based on the nominal cell Voltage of 2.0 V/cell - number of cells = 120 which gives a total Voltage of 240V)	291 A
Max. Discharge Current [A] (The battery max. discharge current is based on a cell end Voltage of 1.70V/cell which gives a total Voltage of 204V)	353 A

Communication and Management

Control Panel	Multi-function LCD status and control console
RS232 Port	Yes
Network Management Card 10/100 Base T	Yes
Audible Alarm	Audible and visible alarms prioritized by severity
Slots Empty	1
Modbus/BMS Card	Optional

Communication and Management	
Emergency Power Off (EPO)	Yes

Physical Values	
Dimensions (H × W × D)	
Unit	1,800 × 1,600 × 810 mm
Shipping	2,080 × 1,830 × 1,016 mm
Weight	
Unit	1,300 kg
Shipping	1,360 kg
Max. Power Cable size [mm]	2 × 70
Recommended Cable sizes	
Ext. Input Cable [mm]	35
Ground Cable [mm]	35
Ext. Output Cable [mm]	25
Ext. Battery cable [mm]	2 × 70
Ext. Alarm Cable Max. [mm]	1.5
Recommended Conduit sizes	
Input	1.5”
Output	1.25”
Battery	2 × 1.5”
Alarm	1/2”

Environmental Values	
Temperature	
Operating	0^{o} - 40^{o} C
Storage	-40^{o} - 70^{o} C
Elevation	
Operating	0 - 1,000 m
Storage	0 - 5,000 m
Humidity	Max. 95% non-conditioned
Protection Class	IP30 (IP32 optional)
Transient Attenuation	Differential mode 60 to 80 dB, Common mode 120 dB
Audible Noise at 3.28 feet (1 m)	60-70 dB, depending on type

Compliance	
Approvals	IEC 62040/EN 50091 Class A, VFI-SS-112

Options

IP32 Roof	1,676 × 864
Relay Boards	2 relay boards with each 16 dry contacts
Modbus/BMS Card	

100kVA 400V UPS

IS100KH

Performance - Linear Load

DC to AC Efficiency [%]	90.7
AC to AC Efficiency [%]	87.5
Heat Dissipation [BTU/h] [W]	38,745/11,345

Electrical Input

Mains	
Voltage	400 V 3 Wire + G
P Nom.	90.67 kW
I Nom. (Nominal input current based on nominal mains voltage and batteries fully charged at 100% ohmic load)	146.38 A
I Max. (Maximum input current based on full battery recharge and nominal mains voltage at 100% ohmic load)	193.9 A
Over-Current protection [A] (Based on continuous full load)	200 A
Input Voltage Range	+ 10%, -15% programmable
Input Frequency	50 Hz $\pm$ 6% programmable
Current Distortion	< 12%
Power Factor	0.8 - 0.9
Bypass	
Voltage	400 V 3 Wire + N + G
I Nom	144.3 A
Over-Current protection [A] (Based on continuous full load)	160 A
Bypass Voltage Range	$\pm$ 10% programmable

Electrical Output

Voltage	400 V 3 Wire + N + G
Nominal current (The output current is based on the nominal apparent power of the UPS)	144.3 A
Frequency Range	50Hz (0.25, 0.50, 1-8%)

Electrical Output

Frequency Regulation	50 Hz, ± 0.1% free running
Output Voltage Range	100% static symmetrical load ± 1%, 100% static asymmetrical load ± 3%,no load to full load ± 4%
Output Harmonic Distortion	<3% linear load <5%
Load Crest Factor	5: 1
Load Power Factor	0.9 leading to 0.7 lagging
Overload Capacity	150% for 1 min., 125% for 10 min., Bypass Operation 1000% for 5 cycles
Connection Type	3 PH + N + G

Battery - External Only

Nominal Voltage (Nominal battery voltage assumed to be 2.0 V/cell (lead technology)	240 V
Number of Battery Cells	120
Float Charge Voltage	272 Volt DC programmable
Charge Voltage Range	100 to 115% of the DC nominal Voltage, ± 1% IU characteristic
Low Battery Warning Range	210 - 222 Vdc (Factory Setting 210 V)
Low Battery Shutdown	204 Vdc
Full Load (P) (The battery power takes in to account the DC-AC efficiency of the main inverter for linear load)	87.4 kW
Recommended Breaker Size [A]	500 A
Connection Type	Hard Wire 3-wire (DC+/- + G)
Nominal Discharge Current [A] (The battery nominal discharge current is based on the nominal cell Voltage of 2.0 V/cell - number of cells = 120 which gives a total Voltage of 240V)	364 A
Max. Discharge Current [A] (The battery max. discharge current is based on a cell end Voltage of 1.70V/cell which gives a total Voltage of 204V)	442 A

Communication and Management

Control Panel	Multi-function LCD status and control console
RS232 Port	Yes
Network Management Card 10/100 Base T	Yes
Audible Alarm	Audible and visible alarms prioritized by severity
Slots Empty	1
Modbus/BMS Card	Optional

Communication and Management	
Emergency Power Off (EPO)	Yes

Physical Values	
Dimensions (H × W × D)	
Unit	1,800 × 1,600 × 810 mm
Shipping	2,080 × 1,830 × 1,016 mm
Weight	
Unit	1,500 kg
Shipping	1,575 kg
Max. Power Cable size [mm]	2 × 95
Recommended Cable sizes	
Ext. Input Cable [mm]	70
Ground Cable [mm]	50
Ext. Output Cable [mm]	35
Ext. Battery Cable [mm]	2 × 95
Ext. Alarm Cable Max. [mm]	1.5
Recommended Conduit sizes	
Input	2.50”
Output	1.25”
Battery	2 × 2”
Alarm	1/2”

Environmental Values	
Temperature	
Operating	0^{o} - 40^{o} C
Storage	-40^{o} - 70^{o} C
Elevation	
Operating	0 - 1,000 m
Storage	0 - 5,000 m
Humidity	Max. 95% non-conditioned
Protection Class	IP30 (IP32 optional)
Transient Attenuation	Differential mode 60 to 80 dB, Common mode 120 dB
Audible Noise at 3.28 feet (1 m)	60-70 dB, depending on type

Compliance	
Approvals	IEC 62040/EN 50091 Class A, VFI-SS-112

Options

IP32 Roof	1,676 × 846
Relay Boards	2 relay boards with each 16 dry contacts
Modbus/BMS Card	

Options

For information on options and accessories available in your region, please contact APC - See “How to Contact” on the back cover of this manual.

IP32 drip shields, Communication cards and Relay boards are described in the following.

IP32 Drip Shield

If the UPS is installed in an environment with dripping, non-corrosive liquids, install a IP32 drip shield to prevent such non-corrosive liquids from dripping into the UPS.

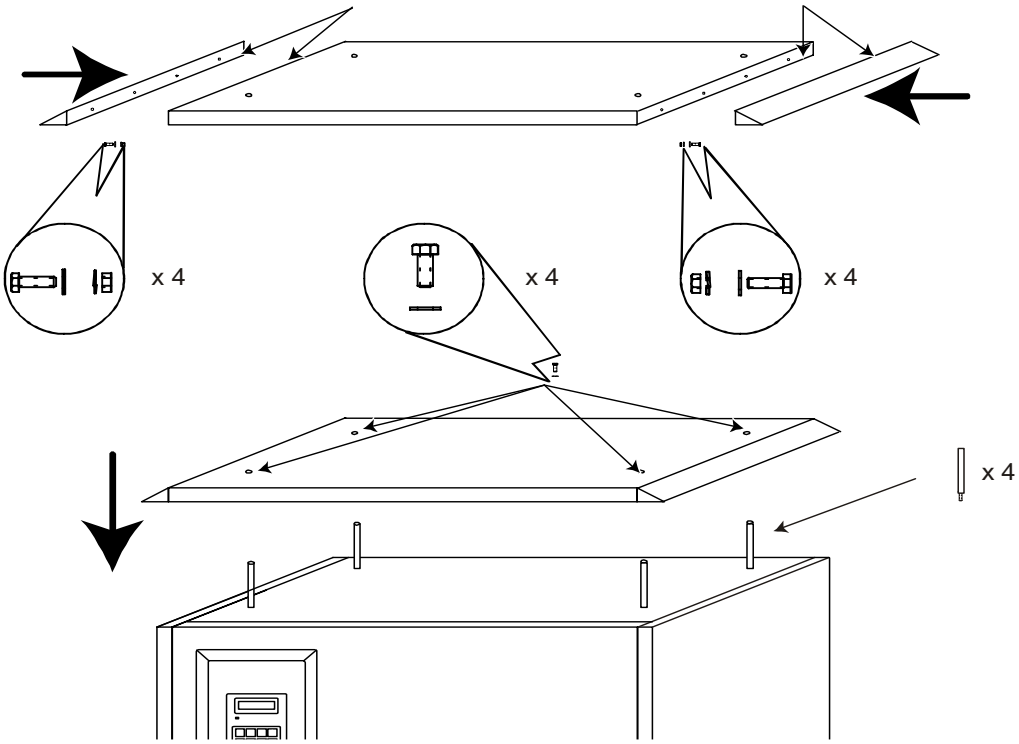
To achieve protection IP32, the UPS must be equipped with the drip shield and an air filter at the bottom.

For further information on air filter, see section on “Air Filter” on page 6.

Mounting the drip shield

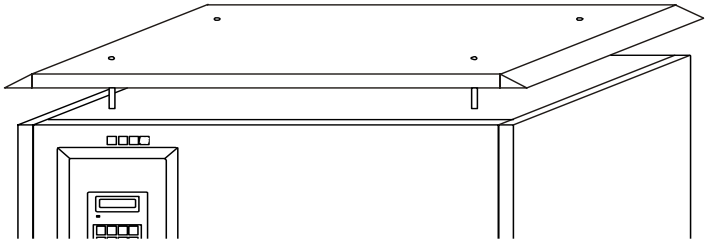
❶ Remove protection foil before assembly!
(not shown on illustration)

❷ Mount sides on drip shield

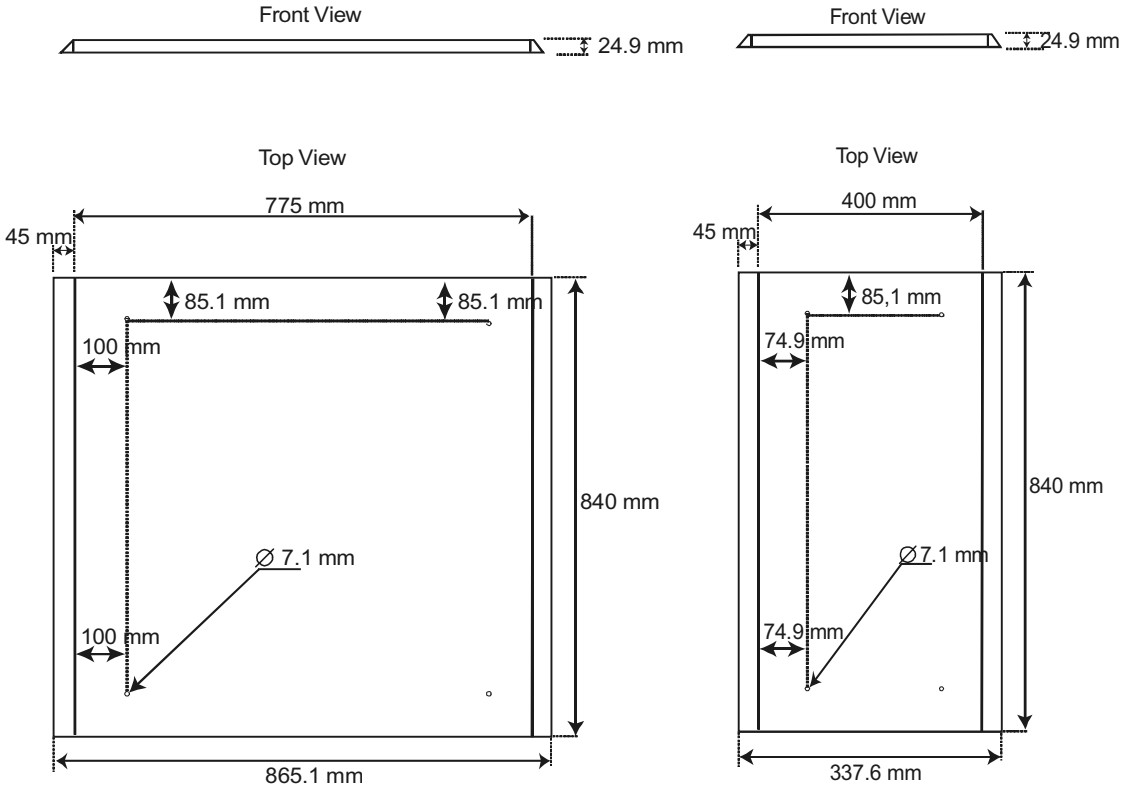


❸ Remove the 4 bolts from UPS drip shield and mount the 4 stand-offs.

❹ Reuse bolts from UPS roof to attach drip shield

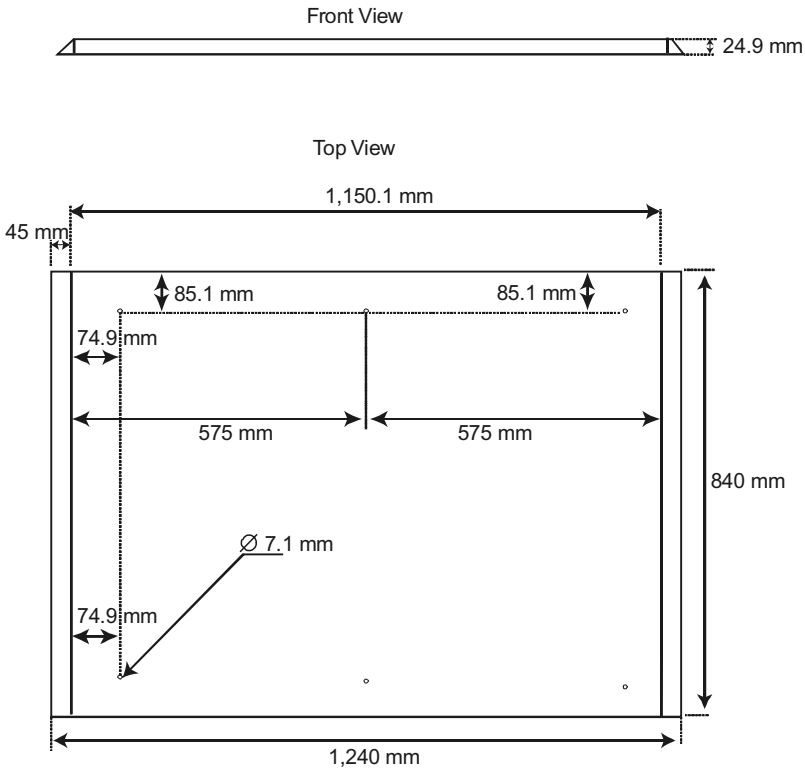


Drip shield sizes



IP32 for 10 – 30 kVA and 80 – 100 kVA UPS

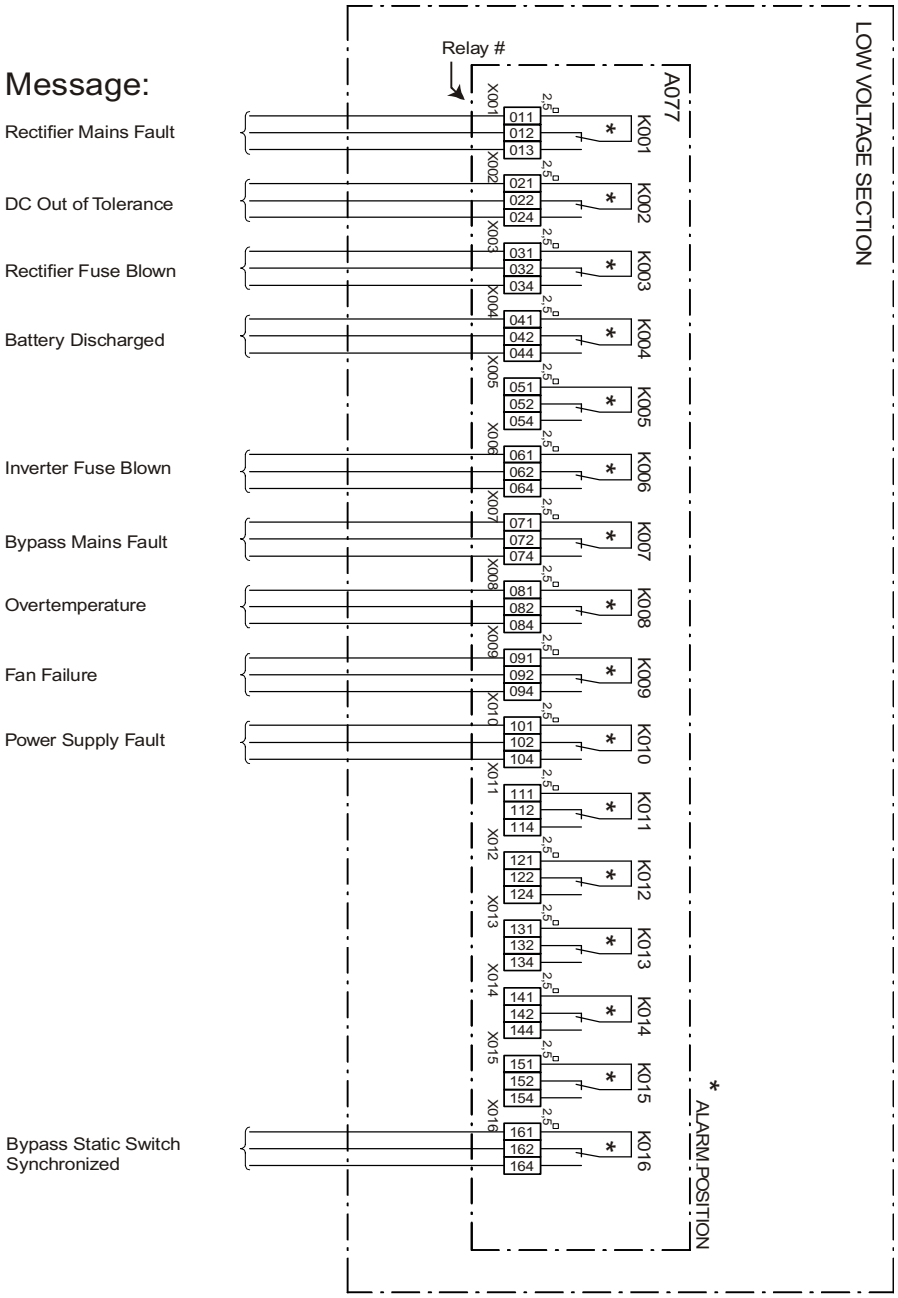
IP32 for Battery Enclosure

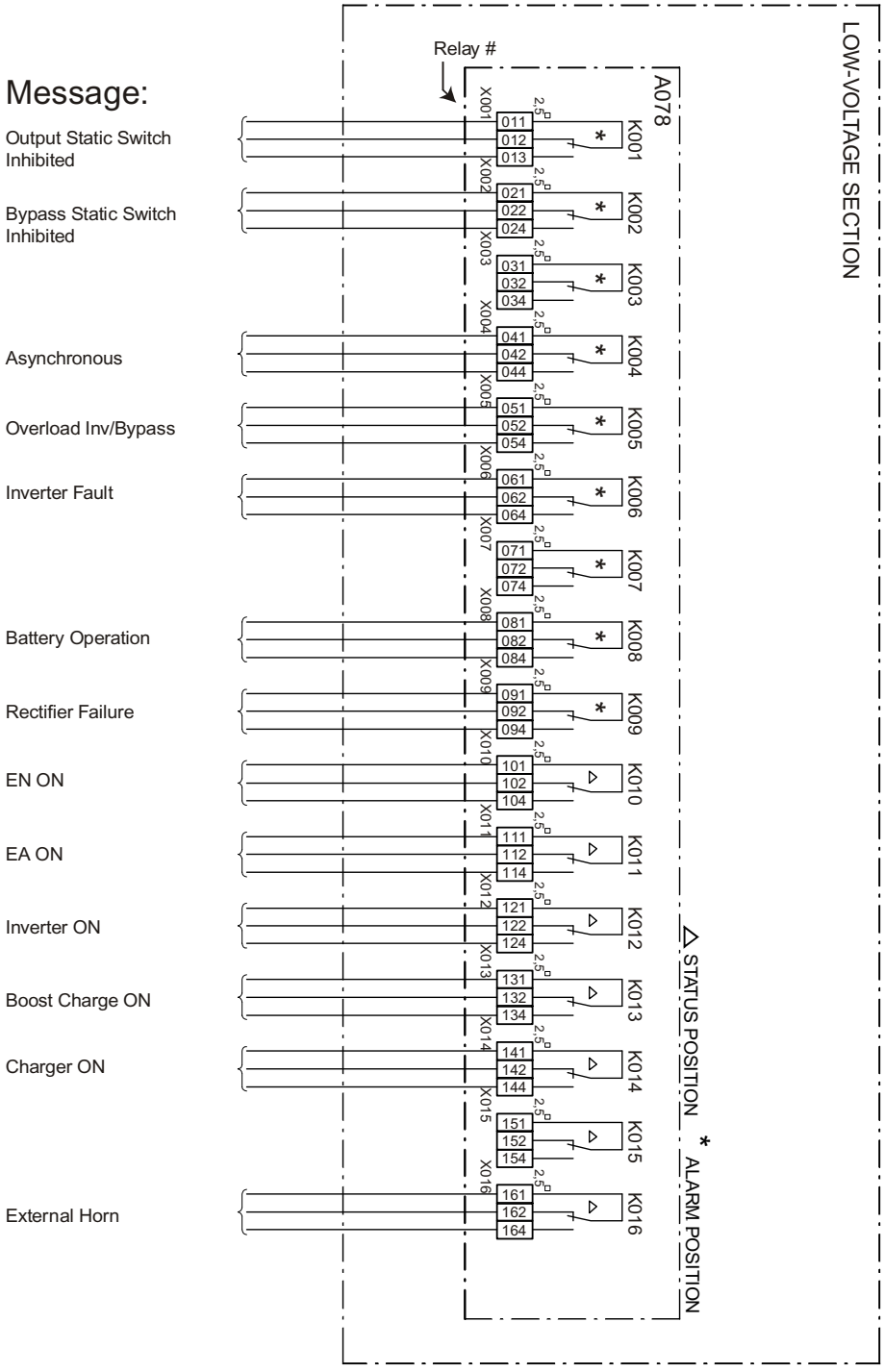


IP32 for 40 – 60 kVA UPS

Relay Board

All alarms are shown in alarm position (*). Status is shown in status position (Δ). All relay change-over contacts are 2A 250 Vac or 0.5 60 Vdc. Maximum cable size is AWG 14 (2.5 mm^2).

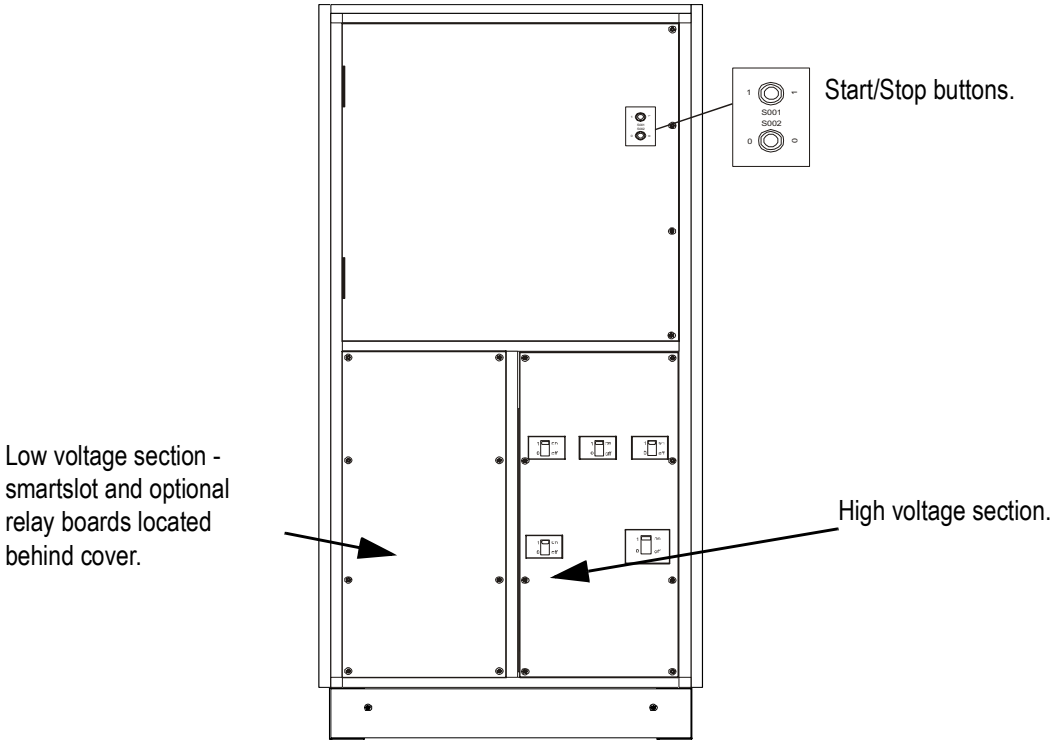



Message:
Output Static Switch Inhibited
Bypass Static Switch Inhibited
Asynchronous
Overload Inv/Bypass
Inverter Fault
Battery Operation
Rectifier Failure
EN ON
EA ON
Inverter ON
Boost Charge ON
Charger ON
External Horn
Relay #
A078
LOW-VOLTAGE SECTION
△ STATUS POSITION * ALARM POSITION
X001 011 012 013 K001
X002 021 022 024 K002
X003 031 032 034 K003
X004 041 042 044 K004
X005 051 052 054 K005
X006 061 062 064 K006
X007 071 072 074 K007
X008 081 082 084 K008
X009 091 092 094 K009
X010 101 102 104 K010
X011 111 112 114 K011
X012 121 122 124 K012
X013 131 132 134 K013
X014 141 142 144 K014
X015 151 152 154 K015
X016 161 162 164 K016
2.5

Communication Cards

Cards and slots

Two slots are provided for optional communication cards behind the cover of the low voltage section.



Four cards are available for the AIS 5000 UPS from APC:

- Network Management Card
- Modbus/BMS Card
- Environmental Monitoring Card
- Network Management/Environmental Monitoring Card

For further information, please contact APC (phone numbers on the back of this manual) or visit our Web-site on www.apc.com where you will find detailed product descriptions, features & benefits and product literature for the above cards.

Programming and Set-Up

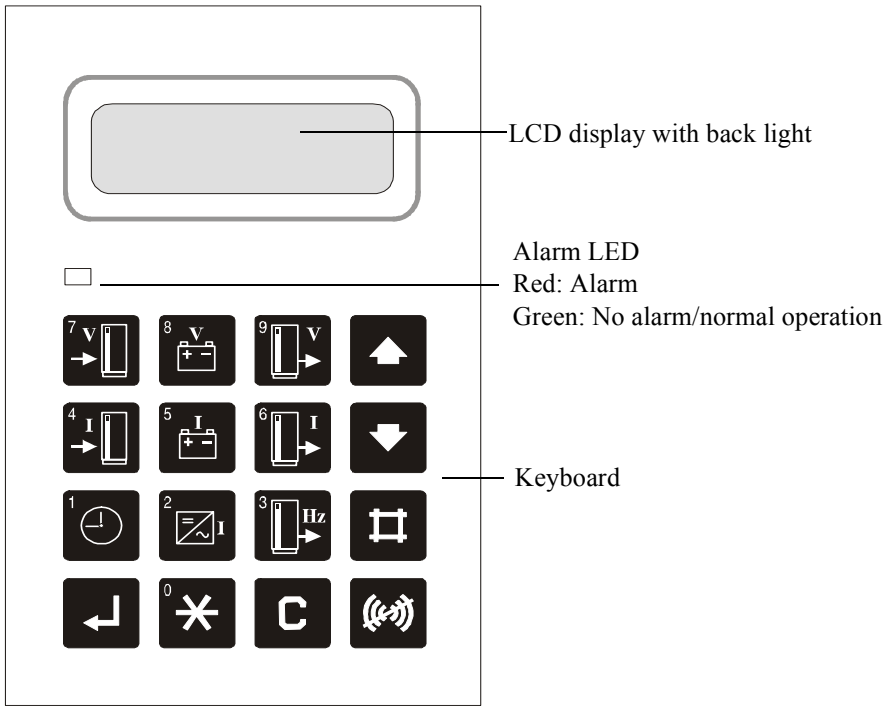
Display

Display introduction

The display on the front of the UPS is the interface between the user and the UPS. The display is provided with a Light Emitting Diode (LED) alarm indicator and a keyboard. The display shows measured values and alarm messages. In alarm situations, or when keys are activated, the back light in an active display is set to switch off automatically after 5 minutes of inactivity.

The LED alarm is a visible signal that indicates incorrect operation. If an alarm is present, the LED changes to red light.

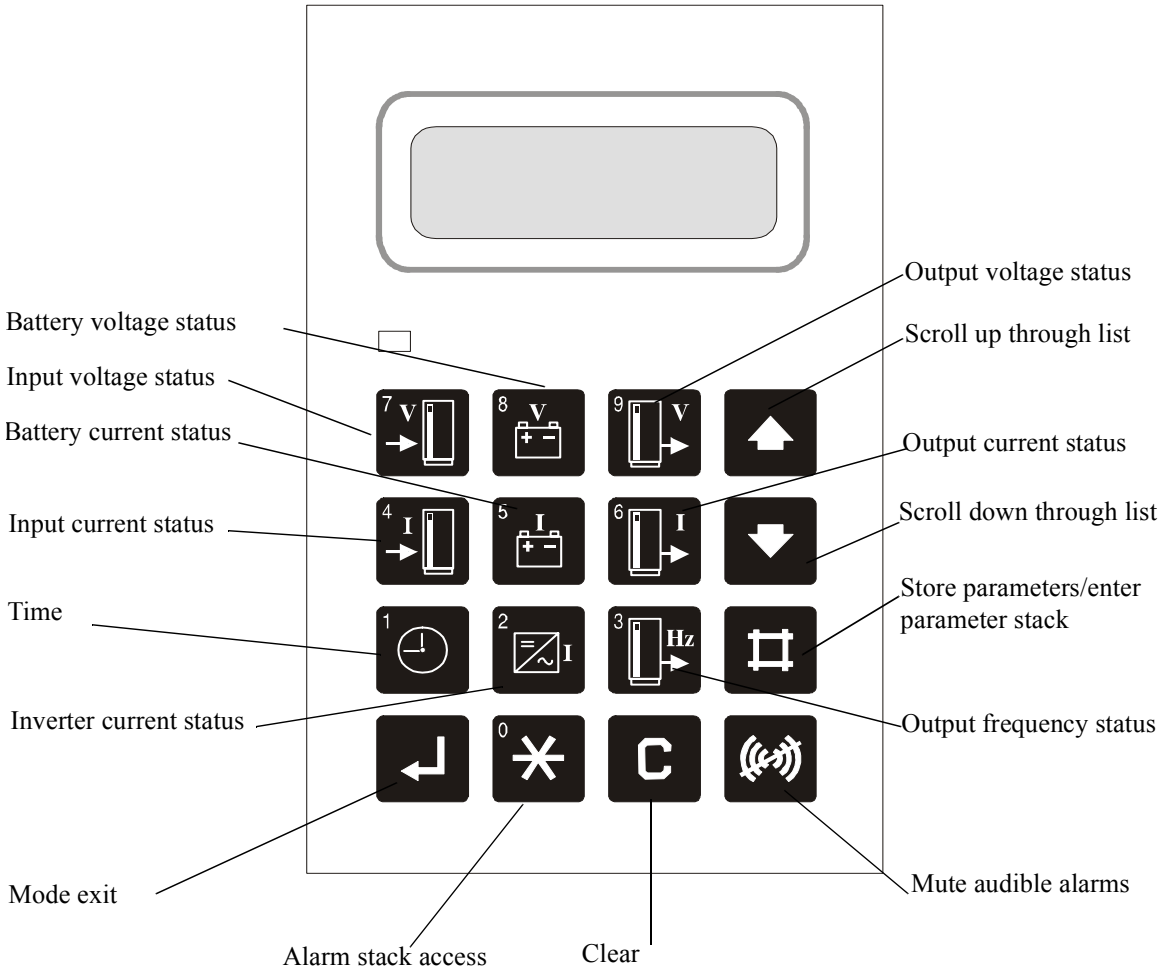
Use the keyboard to program operating parameters, and to display parameters / alarm messages. The display will show the current operational mode of the UPS.



Note

Display accuracy: ±2%, ±1 digit.

Display functions



For a status report on the UPS, or to program the system, press the applicable display key.

To increase the back light contrast, press 1 and ▲ simultaneously. To decrease the contrast press 1 and ▼ simultaneously.

Note

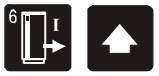
Following a 20-second inactivity, the display will automatically switch back to show the current operational mode.

Note

If the operation mode is changed, the display will automatically show the new mode. In such situations, all entries must be repeated by using the keyboard for UPS programming or status display.

Display messages

To read measurements, press one or two keys simultaneously as shown below. (Illustrated values are examples only).

Action	Display Messages	Description
	98.01.16 10.22,13	Shows date/time: Year, month, day/hour, minute, second
	Mains 1 voltage 400 400 400Vac	Mains 1 voltage is 3 x 400 V
	Mains 1 current 16 16 16Aac	Mains 1 current is 3 x 16 A
	Battery voltage 272Vdc	Battery voltage is 272 Vdc
	Battery current + 2Adc	Charging current is (+) 2 Adc (Discharging current (-))
	Output voltage 400 400 400Vac	Output voltage is 3 x 400 V
	Output current 15 15 15Aac	Output current is 3 x 15 A
	Output frequency 50Hz	Output frequency is 50 Hz
	Battery temperature 25°C	Battery temperature is 25°C (77°F) (OPTION)
	Output peak current 22 22 22A	Output peak current is 3 x 22 A
	Normal operation load power xx%	Returns to normal display status. If the display is inactive for 20 sec., it will automatically switch back to show current operation mode.
	Total DC current 10Adc	Total DC current (10Adc)
	Mains 2 Voltage 400 400 400Vac	Mains 2 voltage is 3 x 400 V
	Inverter Current 40 40 40Aac	Inverter current is 3 x 40 A

Mains = Utility

Programming the UPS

User stack

Parameter	Comments
Language	Default language: English. Second language: German. To activate the second language, push  and browse through the menu, using the cursor keys  or  until the display shows: **Second Language: OFF** To activate the second language, push  . The display shows: **Second Language: ON** To return to English, push  .
Autostart	To activate the autostart function, push  and browse through the menu, using the cursor keys  or  until the display shows: **Autostart: OFF** To activate the autostart function, push  . To deactivate, press  . If Autostart is on and the UPS is in Standby mode, the UPS will restart automatically when the mains supply is restored.

Bypass Operation	Push  and the cursor keys  or  until the display shows: To select Bypass Operation, push  . The UPS will switch to Bypass Operation if the bypass mains is within the specified tolerance range. The display will show: The load is now supplied from the bypass mains through the static switch. Bypass mains voltage and output voltage will appear on the display. To return to Normal Operation, push  . The UPS transfers from one operation mode to another without affecting the load.	**Bypass Operation: OFF** **Bypass Operation**
Boost Charge	To program the UPS for Boost Charge, press  and browse through the menu, using the cursor keys  or  . The display shows: Choose Boost Charge by selecting  . To deactivate, press  . When the Boost Charge function is selected, the UPS will remain in the Boost Charge operational mode for 8 hours. To change the boost charge operating time, contact APC. (The UPS can be programmed to stay in this mode for up to 24 hrs).	**Boost Charge: OFF**

Auto Boost Charge	To program the UPS for Auto Boost Charge, select  . Browse through the menu, using the cursor keys  or  until this message appears: Select Auto Boost Charge by pressing  . Deactivate by pressing  . When the Auto Boost Charge function is selected, the system will automatically switch to Boost Charge Operation if the battery has been discharged. The UPS will only stay in the Boost Charge operational mode for 8 hours. When the UPS is working in Auto Boost Charge operational mode, the charger is outside the battery current limitation. To change the Auto Boost Charge operating mode, contact APC. (The UPS can be programmed to stay in this mode up to 24 hrs).	**Auto Boost Charge: OFF**

Battery Capacity Test	Make sure the UPS has been in normal operation for at least 8 hours and that the batteries are fully charged before performing this test. To test the Battery Capacity press and browse through the menu, using the cursor keys or until the display shows: (xxx indicates the backup time from the last Battery Capacity test). If this test has not been performed before – or if the test has been aborted, the display shows: To proceed with the test, press or to abort. The display shows: Wait until the display shows: a short audible alarm will sound. Press until the display shows: (xxx represents the actual backup time in minutes) Press or wait 20 seconds until the display shows: If a mains failure occurs during a battery capacity test, the test will immediately abort. No test results will be obtained and the display will show:	      

Battery Monitor Test	This parameter will only appear on the display, if the Advanced Battery Monitor option is installed. To perform the Battery Monitor Test, push  and browse through the menu, using the cursor keys  or  until the display shows: **Battery Monitor Test: OFF** To perform a Battery Monitor Test, select  To deactivate, press  . The Battery Monitor Test checks the battery condition by switching off the rectifier, and running the inverter in battery operation until 25% of the battery capacity is used. • In the event of a battery failure, the rectifier will automatically switch on. There will be no output voltage loss. • If the battery condition is within the tolerance range, no alarms will appear on the display. **Battery Monitor Warning** • In case of reduced battery capacity, one of the following two alarms will appear on the display: **Battery Monitor Alarm** – Battery Monitor Warning — means that the battery capacity is reduced by 25% or more. – Battery Monitor Alarm — no battery capacity or capacity is reduced by 50% or more.

Battery Monitor Reset	This parameter will only appear on the display if the Advanced Battery Monitor option is installed. To reset the battery monitor, push and browse through the menu, using the cursor keys or until the display shows: **Battery Monitor Reset: OFF** To reset the Battery Monitor Alarms, press .
Settings for redundant systems	
Adaptive Slew Rate	To program the UPS for Adaptive Slew Rate, press . Browse through the menu, using the cursor keys or until the display shows: **Adaptive Slew Rate: OFF** Select Adaptive Slew Rate by pressing . Deactivate by pressing .
Enter New Date	To program the date setting, press . Browse through the menu, using the cursor keys or until the display shows: **Enter new date YY.MM.DD** Enter the new date by using the numeric keys. Enter the year, month, and day. Store the by pressing .

Enter New Time	To program the time setting, press ⌗ . Browse through the menu, using the cursor keys ▲ or ▼ until the display shows: **Enter new time HH.MM.SS** Enter the new time by using the numeric keys. Enter the hour, minute, and second. Store the time by pressing ⌗ .

Setting stack

In the setting stack, the following parameters are changeable:

Parameter	Factory Setting
Normal Charge Voltage	272 Vdc
Boost Charge Voltage	272 Vdc - no boost required
Charge Current Max.	Refer to below table
Low Battery Warning	216 Vdc
Low Battery Shutdown	204 Vdc
Boost Charge Time	8 hours
Slew rate 0 – 4	1 Hz
Charger ON/OFF	ON
Inverter and Bypass ON/OFF	ON
Battery Back-up Time	Until a battery capacity test has been performed, display will show xxx
High Battery Temperature	35^{o}C
Auto Battery Monitor	ON
Battery Summary Error	OFF
Remote Shutdown	OFF
Remote Shutdown Polarity	HIGH
Remote Shutdown Time	2 minutes

Max. Charge Current	
UPS	**A$_{DC}$**
10 kVA	5
20 kVA	10
30 kVA	15
40 kVA	20
60 kVA	30
80 kVA	40
100 kVA	50

How to change factory settings:

Press  and  simultaneously and enter 282828

Browse through the setting stack, using  or  until the setting you wish to change is displayed.

Enter the new setting by using the numeric keys on the keyboard.

When the new setting is entered press  to store.

If the setting only has an ON or OFF function, press  to choose ON and  to choose OFF.

Operation Modes

The display automatically indicates the current UPS operation mode. See the table below for examples of operation modes and their descriptions.

Operation mode descriptions:

Operation Mode	Description of Operation Mode
Normal Operation	The inverter supplies the load. The charger uses the mains supply to feed the inverter.
Battery Operation	The inverter supplies the load. The battery bank supplies the inverter. In battery operation the load support time is limited; when the batteries are discharged the UPS is unable to supply the load.
Bypass Operation	The bypass static switch supplies the load, meaning that the load is supplied directly from the bypass mains. When working in bypass operation the UPS can switch to battery operation if the bypass mains fails.
Charger Only	The charger is recharging the battery. The inverter is shut down.
Economy Operation	The UPS is in permanent bypass operation and will only switch to battery operation if the bypass mains is out of tolerance.
Hot Standby	In redundant configurations, one UPS can switch off the inverter, but still keep the inverter ready for immediate start in case another UPS fails.

In standby mode, the UPS has no output voltage.

Users do not require electrical qualifications to switch the UPS to and from standby mode/normal operation.

Normal to Bypass Operation

Press  and the cursor keys  or  until the display shows:

Bypass Operation: OFF

Press  . If the bypass mains is within the tolerance range, the UPS will transfer to electronic bypass. The display shows:

Bypass Operation

The load is now supplied directly from the bypass mains.

If the bypass mains fails during bypass operation, the UPS will automatically switch to normal operation, provided that the rectifier mains is available. If the battery supply is available, and within the tolerance range, the UPS will switch to battery operation.

Depending on the programming, a short loss of output voltage may occur.

Bypass to Normal Operation

1. Press  and the cursor keys  or  until the display shows:

Bypass Operation: ON

2. Press  The display will show:

Normal Operation Load Power xx%

The load is now supplied by the UPS.

Normal to Manual Bypass Operation

Caution

CAUTION!

Never operate the manual bypass switch when the UPS is in normal operation.

Press  and the cursor keys  or  until the display shows:

Press  . If the bypass mains is within tolerance range, the UPS will transfer to electronic bypass. The display shows:

Make sure that the Bypass Static Switch is turned on.

Switch on the Manual Bypass Switch (Q050).

Switch off the Output Breaker Q100.

Push the S002 button on the front panel in order to turn the UPS off. The UPS changes to standby operation. Display shows:

Switch off the Q090, Q001 and Q004 breakers.

Wait 30 seconds until the UPS display and all LED indications are switched off.

Note

The load is now supplied directly from the bypass mains.

Caution

CAUTION!

When the UPS is in bypass operation, the load support will be disrupted if the bypass mains fails.

Manual Bypass to Normal Operation (including start up procedure)

1. Switch on the rectifier mains supply by closing the Q001 breaker. The display shows:

   System Type UPS AIS 5000

   After 10 seconds the display message changes to:

   Standby

2. Press the S001 Start button on the front panel. The display shows:

   Normal Operation Load Power xx%

3. Check the battery voltage reading on the display by selecting  .
4. Connect the battery by closing the Q004 breaker.
5. Check that the inverter output voltage is within tolerance range by pressing  .
6. Switch the Q090 breaker on.
7. Wait 10 seconds to ensure that the UPS is synchronized.

   Bypass Operation: OFF

8. Switch the UPS to bypass operation by pressing  and the cursor keys  or  until the display shows:

   Bypass Operation

9. Press  and if the bypass mains is within the tolerance range, the UPS will transfer to electronic bypass. The display shows:
10. Make sure that the Bypass Static Switch is on.
11. Switch the Q100 output breaker on.
12. Switch the Manual Bypass Switch (Q050) off.

    Bypass Operation: ON

13. Switch the UPS to normal operation by pressing  and the cursor keys  or  until the display shows:

    Normal Operation Load Power xx%

14. Press  . The display will show:
15. Verify that the Alarm LED changes to green.

The load is now supported by the UPS.

APC Worldwide Customer Support

Customer support for this or any other APC product is available at no charge in any of the following ways:

- Visit the APC Web site to access documents in the APC Knowledge Base and to submit customer support requests.
  - **www.apc.com** (Corporate Headquarters)
    Connect to localized APC Web sites for specific countries, each of which provides customer support information.
  - **www.apc.com/support/**
    Global support searching APC Knowledge Base and using e-support.
- Contact an APC Customer Support center by telephone or e-mail.
  - Regional centers:

Direct InfraStruXure Customer Support Line	(1)(877)537-0607 (toll free)
APC headquarters U.S., Canada	(1)(800)800-4272 (toll free)
Latin America	(1)(401)789-5735 (USA)
Europe, Middle East, Africa	(353)(91)702000 (Ireland)
Japan	(0) 35434-2021
Australia, New Zealand, South Pacific area	(61) (2) 9955 9366 (Australia)

  - Local, country-specific centers: go to **www.apc.com/support/contact** for contact information.

Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

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